The e-learning e-volution in colleges and universities

A Pan-Canadian Challenge

The Advisory Committee for Online Learning

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A Message from the Advisory Committee for Online Learning

The Advisory Committee for Online Learning has found that knowledge and innovation are increasingly critical to sustaining the economic, social and cultural development of Canada. It is now more important than ever that Canada ensure equitable, affordable and expanded access to quality post-secondary learning.

In this report, we discuss the opportunities that information and communications technologies, particularly the Internet, present to our post-secondary institutions. The development of online learning, and learners' rapid adoption of it, has sparked massive investments by institutions and corporations worldwide in this emerging market.

Our institutions must respond to these changing circumstances. Some will perceive online learning as a threat to their established role and practices. Others will seize it as a means of extending their reach and service to learners. We hope our report identifies and elaborates on the issues that are becoming critical to enabling Canadian post-secondary institutions and faculties to move forward with online learning.

We are convinced that Canadians are among those who will gain the most from the effective use of information and telecommunication technologies in building a creative and knowledge-based society. The extent to which Canada benefits will to a considerable degree be determined by how quickly and effectively our institutions embrace online learning.

Finally, we would like to thank Minister Glenn Hagel, Minister Brian Tobin and former Minister of Industry, John Manley, for providing this unique opportunity to come together and present our ideas and offer our advice for the greater utilization and adoption of online learning.

David T. Barnard

David T. Barnard
President and Vice-Chancellor,
University of Regina

Gisèle Chrétien

Gisèle Chrétien
President, Collège Boréal

David Johnston

David Johnston
President, University of Waterloo,
and Chair, Advisory Committee
for Online Learning

Veronica Lacey

Veronica S. Lacey
President and Chief Executive
Officer, The Learning Partnership

Bernard Lachance
Director General,
Collège de Lévis

Sheldon Levy

Sheldon H. Levy
President, Sheridan College,
and, recently, Vice-President,
Government and Institutional
Relations, University of Toronto

I Lewis

Irene Lewis
President and Chief Executive
Officer, Southern Alberta
Institute of Technology

Noreen Lobban

Noreen Lobban
Principal/Director, New
Brunswick Community
College Miramichi

John T McLennan

John T. McLennan
Vice Chairman and Chief
Executive Officer, AT&T Canada

Peter Nicholson

Peter J. M. Nicholson
Chief Strategy Officer,
BCE Inc.

Kelvin K Ogilvie

Kelvin K. Ogilvie
President and Vice-Chancellor,
Acadia University

Elizabeth Parr-Johnston

Elizabeth Parr-Johnston
President and Vice-Chancellor,
University of New Brunswick

Bernie Sheehan
President, Technical University
of British Columbia

Richard J. Van Loon
President and Vice-Chancellor,
Carleton University

Harriet H Stairs

Harriet H. Stairs
Former Executive Vice President,
Human Resources,
Bank of Montreal

John Wetmore

John D. Wetmore
President and
Chief Executive Officer,
IBM Canada Ltd.

Carol Stephenson

Carol Stephenson
President and
Chief Executive Officer,
Lucent Technologies Canada

Thomas L. Wood
President,
Mount Royal College

François Tavenas
Rector, Université Laval

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We extend our thanks and admiration to Yuri Daschko, Director of the Multimedia Learning Group, and Nadia Lombardi, our executive secretary, as well as her staff — Anastasia Gould, Susan Johnston, Brad Kelly, Vlad Mahu and Christine McKay — from the Information Highway Application Branch of Industry Canada for their support of our efforts. We wish also to express our gratitude to our distinguished external advisers, Sir John Daniel, Frank Newman and Michel Moreau, for their insightful advice. Our deliberations were informed, too, by background papers prepared by Terry Anderson, Tony Bates, Stephen Downes, Glen Farrell, Thomas Keenan and Bruce Pennycook. Finally, we would like to thank our writer, John Sifton.

Preface

In a global society based on expanding knowledge, Canada's health as a civil society and its economic competitiveness, as well as the success of individual Canadians, will hinge on having the best possible education and access to lifelong learning opportunities. Around the world, online learning — the use of digital networks to deliver and support learning opportunities — has emerged as a powerful and transformative means to meet these learning needs, as well as to extend and enrich traditional modes of instruction, at the post-secondary level.

This report sets out an action plan for expanding online learning in Canadian post-secondary education to meet the learning needs of individual Canadians, improve our economic competitiveness and sustain the health of our civil society in this new knowledge-intensive era. It is the work of the Advisory Committee for Online Learning, composed of Canadian university presidents, college presidents and senior business executives.

The Advisory Committee was jointly created in June 2000 by the Consortium on Public Expectations for Postsecondary Education of the Council of Ministers of Education, Canada (CMEC) and Industry Canada. This shared sponsorship bodes well for action on the Advisory Committee's recommendations and has its foundation in a convergence of concern, unprecedented in the Canadian learning field, between the two orders of government.

Converging Provincial, Territorial and Federal Concerns

In the last five years, provincial, territorial and federal governments and their agencies, as well as universities and colleges, have repeatedly recognized the importance of lifelong learning to success in a knowledge-based society and the potential of new learning tools both to enrich traditional teaching and to extend lifelong learning opportunities to Canadians in all walks of life.

Many provincial governments and institutions have set in motion serious efforts to mount online learning programs as a means of meeting the growing demand for lifelong learning opportunities and responding to the interests of a new Internet-savvy college generation. Since 1993 TeleEducation New Brunswick has been providing courses from provincially funded universities, colleges and secondary schools to 40 communities across New Brunswick. The Government of Alberta, through its Learning Enhancement Envelope, has also been a long-time supporter of online learning and in June 2000 announced significant new technology funding to redevelop post-secondary courses for distance and multimedia delivery. In July 2000 the Ontario government launched a $5 million TVOntario Lifelong Learning Challenge to create new and innovative opportunities for Ontarians to learn critical job skills through the Internet.[1] In Quebec, the ministry of education announced in May 2000 that it will invest $35 million in a $56 million-dollar fibre-optics network connecting institutions of higher learning.[2]

Federal, provincial and territorial governments and the education and business sectors have already connected every school and every public library in Canada to the Internet through SchoolNet. Through other SchoolNet programs such as NoteMakers, Canada's Campus Connection, and the Multimedia Learnware and Public Access Applications Program, post-secondary institutions receive assistance in building learning lanes on the Information Highway that connect them to new opportunities to reach learners. Human Resources Development Canada, through its CanLearn Information Products Group, provides national and international online portals to support access to traditional and online learning opportunities. These are: CanLearn Interactive, a bilingual one-stop Internet resource for learning information products and services; and EduCanada, a multilingual online resource aimed at promoting Canadian learning opportunities to foreign students. As well, CANARIE, Canada's advanced Internet development organization, already links about half of our urban institutions of higher learning with CA*net 3, the fastest Internet backbone in the world. In May 2000, CANARIE announced support through its Learning Program of 10 projects worth some $10 million to enhance the education and training sector and improve learning outcomes for Canadian citizens.[3]

This federal effort partly occurred because the Information Highway Advisory Council reporting to the federal Minister of Industry in 1995 and 1997 made more than 30 recommendations on learning and training and saw "lifelong learning as a key design element of Canada's Information Highway" and a fundamental operating principle in its mandate. In response, the Minister of Human Resources Development

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[1] Government of Ontario, "TVOntario challenge fund to create learning and job creation opportunities."

[2] Government of Quebec, "Contribution de 35 millions pour le déploiement d'une inforoute qui servira aux réseaux de l'enseignement supérieur."

[3] CANARIE, "Industry Minister John Manley Announces CANARIE Funding of Advanced Internet Learning Projects."

Canada in 1997 promised to facilitate and foster close collaboration on building a lifelong learning culture in partnership with provinces, territories and key federal departments and agencies.[4] This concern continues.

Our Creation

On the foundation provided by this strong confluence of concern, the CMEC Consortium on Public Expectations for Postsecondary Education, together with Industry Canada, appointed the Advisory Committee for Online Learning in June 2000. The Advisory Committee has now submitted its report to Glenn Hagel, Chair of the CMEC Postsecondary Education Expectations Project and Saskatchewan's Minister of Post-Secondary Education and Skills Training, and federal Minister of Industry Brian Tobin.

The Advisory Committee's work is particularly relevant to the work of the CMEC Consortium.[5] Online learning can contribute to the quality, accessibility, mobility or portability, and relevance or responsiveness, of post-secondary education — four of the six overarching themes of the public expectations identified by the consortium in its 1999 *Report on Public Expectations of Postsecondary Education in Canada*. As Minister Hagel stated in his July 2000 announcement of the Advisory Committee's creation, "Properly designed and delivered, online learning benefits both young and mature students. Online learning allows anytime, anyplace and any-pace delivery. Online learning can be applied on its own, or it can enrich traditional face-to-face learning on campus." A primary reason for Industry Canada's sponsorship of the Advisory Committee was the fear that the competitive challenge from global online learning players would result in the weakening or loss of Canadian post-secondary institutions, thereby damaging one of the key foundations for local and regional economic development.

Our Mandate

The committee's primary mandate is to provide independent advice to the CMEC Consortium and Industry Canada on means to optimize online educational opportunities, as well as on investments required to build a world-class Canadian presence in online learning. The Advisory Committee was asked to address the following issues.

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[4] Government of Canada, *Building the Information Society: Moving Canada into the 21st Century*, p. 22.

[5] The consortium includes all CMEC members except Quebec and the Yukon Territory, both of which have observer status.

- Building on existing studies, what are the main benefits, disadvantages and obstacles to learners, faculty members and institutions to the accelerated incorporation of online learning into post-secondary education?
- What are the internal management options that could best accelerate the adoption of online learning by individual colleges and universities?
- What are the structural options and the value-added benefits of each option, including, in particular, online consortia at the provincial/ territorial, regional or national levels? What strategic and developmental plans would be appropriate?
- What are the main administrative challenges and infrastructure challenges facing institutions, including those working in consortia? How would consensus and collaboration on key issues, such as residency requirements and accreditation, be fostered? If additional resources are needed, what are the top priorities that should be targeted? Are there in-kind services that should be sought? Are there existing governmental programs and instruments that can be used?
- What are the priority actions that need to be taken to accelerate the use of online learning? What can institutions do within existing financial resources? What can be achieved through re-allocation of existing resources?

The committee was also expected to reach agreement on the urgency for online learning, priorities to be addressed, the time line for next steps and the responsibilities of stakeholders for the identified priorities.

Our Process

To tackle our task we divided into five working groups with these mandates: the pros and cons of online learning; institutional management options; structural options and strategic development plans; the main administrative and infrastructure challenges; and priorities and required resources.

With a mandate only five months long, it has been impossible to engage in systematic consultations. However, we have received comments from many interested parties, and these are reflected in our report.

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Executive Summary

Profound change faces Canada's post-secondary institutions. This report is about how we can preserve and build upon the best of the past while seizing the opportunities and overcoming the challenges of the future. The prism through which we view this change is online learning — the use of digital networks to deliver post-secondary education and training — because this new mode of delivery will prove strategic to Canadians as both individuals and a society.

The Consortium on Public Expectations for Postsecondary Education of the Council of Ministers of Education, Canada (CMEC), and Industry Canada created the Advisory Committee for Online Learning and gave it five months to deliberate. This shared sense of urgency bodes well for action on our recommendations and has its foundation in a convergence of concern, unprecedented in the learning field, between the two orders of government.

The New Paradigm

The global knowledge-based society promised in the 1970s, hyped in the 1980s and regarded with a mix of awe and disbelief in the 1990s is now an inescapable reality in the 21st century. Information — its creation, acquisition, adaptation and dissemination — has become the currency of our time. The intellectual and knowledge resources of our post-secondary institutions have become even more fundamental to our success as an economy and a civil society at the local, regional and national levels. The knowledge they can impart has become crucial to the employability of our young adults, to the future careers of the many Canadians facing a continuing need to learn throughout their lives, to our competitiveness in the global economy, to our culture and to our ability to participate fully as individual citizens in Canadian society.

This new reality poses both new opportunities and fundamental challenges to these post-secondary institutions. Never before have these institutions' knowledge and intellectual resources been so much in demand. Yet the very information and communications technologies that have created this knowledge-based society are enabling new global approaches to learning that will allow large corporations and off-shore institutions to compete with our own institutions for Canadian learners.

Growing numbers of young Canadian learners have been immersed for years in the global culture of the Internet and expect the same convenience, speed and easy accessibility in their post-secondary education. A recent survey by Ipsos-Reid places Canada a close second after Sweden in terms of K-12 students' exposure to the Internet.[1] Some 2.5 million Canadian learners at the K-12 level have taken part in the roughly 10 000 collaborative learning projects provided through SchoolNet's GrassRoots Program with the support of every province and territory. With a new generation of online learners emerging from the K-12 system, Canadian institutions must provide online learning opportunities or risk being left behind by global players less responsive to our local, regional and national interests, concerns and priorities. We believe that a pan-Canadian approach will be critical to meeting this challenge.

Online learning can be defined as what occurs when education and training (typically credit but also non-credit) are delivered and supported by networks such as the Internet or intranets. Learners are able to learn any time and any place. In this report, we use the terms "online learning" and "e-learning" interchangeably. In either case, we mean both distance learning and the provision of technology-enhanced learning within a traditional classroom, lecture hall or lab.

In light of these considerations, three overriding preoccupations have shaped and guided our deliberations. These are:

- **fostering a culture of lifelong learning as an essential foundation to building a civil and prosperous society in Canada in a knowledge- and innovation-based environment;**
- **harnessing the transformative power of new learning tools to make sure all Canadians can get improved access to the best possible education and lifelong learning opportunities; and**
- **ensuring that Canada's post-secondary institutions and learnware industry are in the best position possible to secure the benefits and avoid the pitfalls of the move to online learning.**

Online learning represents a way of meeting these demands. But what is it? Online learning can be defined as what occurs when education and training (typically credit but also non-credit) are delivered and supported by networks such as the Internet or intranets. Learners are able to learn any time and any place. In this report, we use the terms "online learning" and "e-learning" interchangeably. In either case, we mean both distance learning and the provision of technology-enhanced learning within a traditional classroom, lecture hall or lab.

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[1] Ipsos-Reid, "Internet Invaluable to Students Worldwide: Many Schools Provide Access to Internet, But Far Fewer Offer Web Courses."

For most traditional on-campus students in their late teens and early 20s, we believe that, used effectively, technology-enhanced learning can provide a useful and enriching complement to traditional classroom teaching. E-mail, discussion forums and multimedia exchanges among instructors, learners and mentors can encourage the emergence of virtual learning communities, personalize the campus learning experience and enrich it by allowing students to reach beyond their physical environs. E-learning can also prepare students for a work world where employers will expect them to learn continuously, often at a distance.

For many lifelong learners, especially adults with family and job commitments, online learning may be their only chance to obtain the higher education they need to compete and survive in a labour market driven by rapidly changing demands for new knowledge and skills. Online learning, properly implemented, should allow them to take courses at home, work or a public access site. Ideally, it should let them find a mix of courses from several different Canadian institutions to meet their particular accreditation and competency needs. Online learning can potentially even make it easier to customize the pacing of courses to the needs of individual students.

It is our conviction that online learning should be deployed and used in such a fashion as to support and enrich both technology-enhanced learning in campus classrooms, lecture halls and laboratories, and learning at a distance from home or work (*see Rec. 1.1*).

We are fortunate to live in an era when new tools based on information and communications technologies have the potential to advance learning and make it more accessible. Yet, as is the case with all new and powerful tools, these must be used with care and understanding. E-learning must not diminish quality and it must be introduced in a manner that gains public acceptance and support from faculty members in our institutions of higher learning. A concerted research effort is needed to determine how online learning can best ensure the highest-quality learning experiences for different kinds of learners. Thus, the first focus of any e-learning initiative — including our own action plan — must be this question of quality.

The Price of Inaction

If we do nothing, online learning will still come to post-secondary education in Canada. But it will increasingly be provided to Canadian learners by off-shore institutions and corporations that will be responsive only to global market forces and their own domestic exigencies.

The issue is much more than markets gained or lost. It is a question of the continued health of our post-secondary institutions. Some analysts believe post-secondary institutions that do not adapt to this e-learning challenge could lead to declining enrolments, smaller grants from government and thus less capacity for institutions to fulfil their role as an intellectual resource and educator for provinces, territories and communities. According to Richard Katz, Vice-President of EDUCAUSE, a Colorado-based association focussing on the intersection between higher education and information technology, "Some colleges and universities might disappear. Some might actually acquire other institutions. One might even imagine a Darwinian process emerging, with some institutions devouring their competition in 'hostile takeovers.' "[2] In the new digital age, many established institutions in Canada and elsewhere may find their positions eroded or expanded by online learning. Few will remain unaffected.

Now some might argue that such losses would be acceptable as long as market forces in the form of foreign institutions and corporations could fill the gaps. We do not believe these gaps can be so easily filled. Canada's institutions have evolved over the years in response to local, regional and national needs and the priorities of Canadian governments. Our social and economic prospects at all levels are intimately dependent on the health of these institutions. Foreign institutions and corporations respond to the needs of their own domestic communities and only secondarily to global markets. The requirements of Canadian learners, communities and employers will not be of much concern in most cases.

Canada's institutions have evolved over the years in response to local, regional and national needs and the priorities of Canadian governments. Our social and economic prospects at all levels are intimately dependent on the health of these institutions. Foreign institutions and corporations respond to the needs of their own domestic communities and only secondarily to global markets. The requirements of Canadian learners, communities and employers will not be of much concern in most cases.

To meet the competitive challenge of the new learning environment, provincial/territorial and federal governments should revalue, reinvest in, and expand access to, initial and continuing post-secondary education as an agent of change and social and economic development in the knowledge-based society (*see Rec. 2.1*).

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[2] Richard Katz, *Dancing with the Devil*, p. 15.

A Pan-Canadian Action Plan

The task facing us is fairly analogous to nation-building efforts undertaken by Canadians during the last three decades of the 19th century and the early 20th century. In that era of growing migration, manufacturing growth and resource extraction, the challenge was to build an infrastructure that would move people, manufactured goods and primary products across the vast expanse of this country. The result was two transcontinental railroads. Our job today involves nothing less than moving to the next stage in building the infrastructure for a knowledge-based society. In an age governed by the rapid creation, acquisition, analysis and dissemination of information, it will be critical to ensure that Canadians are in a position to acquire knowledge and possess the capacity and the opportunity to learn throughout their lives.

Here in Canada the foundation for this knowledge infrastructure is already in place in the form of post-secondary institutions with a worldwide reputation for quality and an innovative multimedia industry. Online learning represents a means to build on that foundation by enriching the quality of post-secondary learning, extending it beyond the campus to where Canadians live and work, and creating new synergies and greater critical mass within post-secondary education.

We propose a pan-Canadian action plan to accelerate the use of online learning in post-secondary education and in lifelong learning.

The major responsibilities for carrying this plan forward will inevitably rest with provincial/territorial and federal governments, and post-secondary institutions themselves. But it will not succeed unless a special effort is made by them to involve our most important educational stakeholders — faculty members, support staff, learners, the larger community and the private sector — in the implementation of e-learning (*see Rec. 3.1*).

Some may object to the federal government playing any role in this area. But the national interest is clear. The health of our post-secondary institutions and the potential of e-learning to make new lifelong learning opportunities available to all Canadians are crucial to regional economic development and diversification and the economic health of communities across the country. The federal government is also concerned that our post-secondary institutions and learnware industry be able to capture a significant portion of the burgeoning global market for e-learning services and material. In pursuing these concerns, the federal government can bring important assets to the table — its authority over telecommunications and its major investments in national communications infrastructure through Canada's advanced Internet development organization (CANARIE), the SchoolNet program, the Community Access Program and other programs. There is also the possibility of future investment to meet the demands for a skilled and knowledgeable work force. Federal government departments such as Industry Canada, the Department of Foreign Affairs and International Trade, Human Resources Development Canada and Canadian Heritage have considerable expertise in learning, marketing, and information and communications technology applications, as well as access to many contacts in, and assessments of, foreign markets.

While taking a necessarily pan-Canadian perspective on many issues, we fully respect in our recommendations provincial and territorial jurisdiction over education. Yet many of our recommendations call for new forms of collaboration among institutions and provincial, territorial and federal governments. We hope that the trust and willingness to cooperate on creative solutions shown in our joint establishment by the CMEC Postsecondary Expectations Project and Industry Canada can be sustained and strengthened in the implementation of our action plan. The challenge is so great it requires the effective use of all our assets as a country.

Themes of inclusiveness pervade this action plan — the need to support both colleges and universities, the importance of meeting the needs of both French- and English-language learners, the imperative of responding to regional differences, the necessity of ensuring that both urban and rural learners can benefit from e-learning, and the importance of involving institutions, faculty members, support staff and learners in implementation. Our action plan focusses on the need for more online learning content (provincial/territorial responsibility) and the telecommunications infrastructure required to deliver it (where the federal government has the lead), as well as the need for incentives and every Canadian's entitlement to learning opportunities (a concern of all governments).

Implementation of this plan is urgent. If we do nothing, our position among the world leaders in online learning will quickly disappear, our own institutions will face stiff and perhaps damaging competition, and Canadians both as individuals and as members of communities will find themselves trailing the people of other G-8 countries in the race for jobs and economic growth.

A Vision for the Future

We have a vision of what can be achieved within five years.

By 2005 the virtual classroom will offer a high-quality learning experience, using technology easy for anyone to use. These improvements will stem from the ever-expanding depth and breadth of knowledge in our colleges and universities, the innovation unleashed by online learning, the passion and skill of online instructors, our serious commitment to learning research and learnware product development, our setting of quality standards for e-learning, the dynamism of virtual learning communities, and the evolution of the technology. These will bear fruit in an online learning experience that is enriching, deep and varied, and capable of passing on the most basic skills and a capacity for critical judgment and reasoning.

Learners will find the learning opportunity most suited to their individual needs, situation, income, language and learning styles, whether online at home, at work or at a public access site, or face-to-face in a traditional campus classroom. Lifelong learning will be an accepted fact of life. Even if job and family commitments prevent Canadians from attending a campus, they will find online the learning opportunities they need as a basis for personal fulfilment, not to mention keeping their job, finding a new one, seeking a promotion or creating their own business. E-learning will allow learners to choose among an unprecedented range of courses and programs from different colleges and universities to find the precise mix that meets their needs. Improved arrangements for credit transfer will enable them to receive appropriate credits toward a degree, certificate or diploma.

New alliances and forms of cooperation among Canada's colleges and universities and the private sector will have created new synergies and critical mass within Canadian post-secondary education. The result will be a system that not only responds to the social and economic needs of Canadians but also wins a sizable portion of the vast market for learning around the world.

A Framework for Action

In this action plan, markets remain secondary to our overriding concern for ensuring that e-learning is expanded in such a fashion as to extend lifelong learning to all Canadians and improve the quality of post-secondary education. We believe that online learning has the potential to improve access to lifelong learning and contribute to equality of opportunity without sacrificing quality. This plan is about realizing that promise. It aims at expanding online learning in such a fashion as to:

- **enhance the quality of the post-secondary learning experience through institutional strategies, expanding the amount of high-quality online learning materials, and supporting learning research and learnware product development;**
- **improve the accessibility and flexibility of post-secondary learning opportunities; and**
- **create synergies and greater critical mass within post-secondary education in Canada.**

These three goals are interdependent: progress in realizing one will reinforce efforts to achieve the others. Conversely, none can be safely ignored without hampering efforts to fulfil the others.

The direct responsibility for delivering online learning will fall upon institutions. If they have not done so already, it will be critical for them at the outset to set up a multi-stage integrated strategic planning process to ensure that they make the right decisions about the sizable investments required for a move into online learning (*see Rec. 3.2*).

1. Enhancing Quality

The potential for a high-quality learning experience from e-learning is clear. Many learners, particularly those with extensive Internet experience, should enjoy the collaborative and self-directed approaches to learning enabled by the online experience. Online learning has the potential to complement and enrich traditional on-campus instruction. In addition to increasing the excitement of knowledge exploration by offering a vista on the world, e-learning should allow learners to develop specific applied skills now in great demand.

The reality is that this promise will not be realized without initiatives to remove significant obstacles to the flourishing of online learning.

Institutional Strategies

Though Canadian institutions have been pioneers in developing content for distance education and e-learning, they have only scratched the surface of what will be required in the next few years. There are a number of strategies that might make meeting this challenge easier.

To provide learners with a high-quality e-learning experience that meets their needs, post-secondary institutions should commit themselves to systematically supporting the development of online modules, courses and programs (*see Rec. 4.1*). It will also be critical to take a systematic approach to overcoming the many obstacles to greater utilization of the new learning tools by faculty members (*see Rec. 4.2*). For faculty members, developing online modules, courses and programs, in addition to providing the labour-intensive coaching most online learners require, can be very time-consuming. For this reason, faculty members cannot be expected to sustain a commitment to e-learning while continuing to carry their traditional teaching, research and community-engagement responsibilities. If e-learning is to flourish, it will be important for institutions to release faculty members from some of their duties so that they will have more time to devote to online learning. However, the provision of such release time will commit institutions to very sizable expenditures they can ill afford — especially at a time of swelling enrolment when faculty members from the baby boom are reaching retirement age.

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Expanding Online Learning Materials and Skills

Critical to fostering a lifelong learning culture will be use of the new learning tools to increase the accessibility of lifelong learning opportunities to Canadians. Yet if online learning is to contribute to the achievement of this objective, then there must be a vastly greater quantity of high-quality e-learning materials than exists at present.

The challenge is considerable and beyond the capacity of any individual institution.

Estimates vary enormously as to the cost of developing a single online course. The average cost of a course developed under SchoolNet's pilot NoteMakers program was $47 000. An initiative under the Canada Youth Employment Strategy, NoteMakers combined the Internet skills of young Canadians with the knowledge and experience of post-secondary educators to produce high-quality online academic materials. By way of contrast, Moe and Blodget, in their study for Merrill Lynch, have estimated that the cost of an "effective, engaging online course" could be as high as US$1 million.[3]

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[3] Michael T. Moe and Henry Blodget, *The Knowledge Web*, p. 185.

Canadian institutions of higher learning face enormous challenges in producing and maintaining an adequate volume of high-quality online learning. Governments need to work together to provide substantial funding in such a way as to stimulate new online education and renew existing material both at the course and program levels.

Many observers believe human resources are the most significant cost in online course development. As well, the more streaming video, copyrighted material and elaborate simulations are used, the higher the costs will be. At the same time, new course-authoring systems can reduce the cost of developing a course. Despite such advances, there can be little doubt that intensifying global competition will drive costs upward as institutions begin to compete by raising the ante with respect to the production values of their course material.

If Canadian institutions are to make a significant commitment to online learning, then they will have to share the costs and take advantage of the synergies and economies of scale available through the kind of cooperation we recommend in Chapter 6. There will also have to be a substantial infusion of new resources.

Canadian institutions of higher learning face enormous challenges in producing and maintaining an adequate volume of high-quality online learning. Governments need to work together to provide substantial funding in such a way as to stimulate new online education and renew existing material both at the course and program levels (*see Rec. 4.3*).

The resulting expansion of e-learning will significantly increase the demand for people with the skills to implement, manage and evolve e-learning environments. The private sector, post-secondary institutions and governments should invest in educational programs to foster these skills (*see Rec. 4.4*).

Learning Research and Learnware Product Development

Given the critical importance of learning to the competitiveness of countries and the success of both individuals and companies, research on learning and development work based on that research should be a top priority for nations around the world.

There is a need for research not only on how to help people learn more effectively, but also on how to prepare them to learn throughout their lives as means of both ensuring their own individual success and meeting the demand for a skilled and flexible work force. In the case of online learning, the rationale for a serious commitment to research and learnware product development is even more compelling. The country that first learns how to harness fully the potential of this new medium, and transforms this understanding into products, will have a competitive advantage over other nations in its capacity to develop human capital.

If the goal is world leadership in learning as a key condition for competitive success, then the Canadian commitment to learning research and development does not measure up. Though faculties of education have taken a major responsibility for pedagogical research, there is a serious need now for research at the level of the individual discipline on how to teach it in the online environment. The research and development required are wide-ranging and comprise at least two broad categories of activity.

If the goal is world leadership in learning as a key condition for competitive success, then the Canadian commitment to learning research and development does not measure up.

First, there is a serious need for more **theoretical and applied research on learning**, both traditional and online. Such research should focus on how people learn, how different people learn differently, how people engage in learning and continue it throughout their lives, and how learning is most effectively imparted. The effort to explore and understand the process of learning throughout life will require serious reflection and investment.

The advent of a new medium inevitably highlights the features of more traditional media, creating an opportunity to explore in greater depth the strengths and weaknesses of both. Thus, there will be a need to examine how learning and teaching at all levels can be remodelled to harness and augment the strengths of both media. There is also a real need for in-depth research focussing on the learning requirements of different disciplines in relation to all of these issues. For example, is there an effective way to provide online the kind of learning experience offered by a traditional chemical laboratory?

This research should be broadly multidisciplinary and issue-oriented as well as problem- and results-oriented. It will require significant new research investments managed in non-traditional ways.

Second, there is a need for a far greater commitment to the **development of learnware products** — the electronic learning tools required to make e-learning effective and exciting to learners. Such tools include course-authoring systems, course management systems, learning objects and modules, various kinds of learning aids, digitized learning resources, multimedia learning environments, and so on. Given the ingenuity and commitment already in evidence within Canada's learnware industry and post-secondary institutions, the payoff from an investment in learnware product development will likely be sizable in terms of exports and jobs.

Neither Canada's young learnware industry nor its post-secondary institutions can sustain by themselves such an extensive research and development effort. Additional investment will be needed from governments. For such investment to be meaningful, it will have to be substantial and provided over the long term. The funding made available for this purpose should also be new (*see Rec. 4.5*).

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After a decade of restraint, and at a time of rising enrolment and growing competition for qualified faculty and staff, institutions cannot undertake this effort at the expense of their other vital duties. Nor should the funding come from a re-allocation of existing funds available for research and development in other areas, given that the level of research and development in Canada is well below that of most of its major industrialized trading partners.

At present, learning research and learnware product development are scattered across many jurisdictions, agencies and institutions, resulting in duplication and a lack of both synergy and critical mass. Research on teaching and learning in most post-secondary disciplines is very limited, to the degree it exists at all. The disbursers of such funding should have a pan-Canadian, multidisciplinary focus and build critical mass and take advantage of synergies across the country. Because research into learning and learnware product development are profoundly different activities, the same funding mechanisms should not be used for both.

Mechanisms for investing in learning research

Every effort should be made to ensure that learning research informs and leads to the development of online modules, courses and programs, as well as to more effective lifelong learning. For this reason, the research should be conducted within post-secondary institutions where the capacity to conduct such research already exists and where much of it will find its initial application. Priority for such funding should be placed on publicly funded Canadian institutions, their faculty, and consortia of such institutions. Such funding should be available to both universities and colleges (*see Rec. 4.6*).

Given the importance of academic freedom and institutional autonomy, the investment mechanism used should not be government itself, but a body at arm's length from government. The organization should also be a body that is familiar to the academic community and makes use of academic juries. This approach would have the welcome effect of placing teaching and research, from the academic's viewpoint, on an equal footing in terms of availability of external funds, peer recognition, freedom of expression and opportunities for creativity. One result would be a renewed commitment to teaching.

In Canada, only the federal granting councils meet all these criteria, but they tend naturally to be focussed on supporting and stimulating research in their mandated areas. There is a definite risk that in such an environment learning research, even in specific disciplinary areas, might get lost in the shuffle. As well, colleges rarely receive funding support from the councils.

The ideal solution would be to establish a fourth granting council with a mandate focussed on broad, results-oriented, multidisciplinary research into traditional and online learning at both colleges and universities. Its very existence would be a powerful acknowledgment of the reality that learning is now critical to Canada's success in a global knowledge-based society. Online learning will be a key instrument in bringing that learning to Canadians throughout their lives. We recognize, however, that it is no easy task to create a new body or institution.

Thus, to address the nation's need for applied and theoretical research on learning (both traditional and online) at every level and in every discipline, we can only present the federal government with options. One is to provide additional resources for a separate program to the existing granting councils to facilitate this research, contingent on the creation of a central, tri-council, coordination committee to oversee such research. The other is to create a fourth granting council to facilitate this research at arm's length from government (*see Rec. 4.7*). Under either of these options it will be important to ensure that the granting councils consult in an appropriate fashion with the CMEC, the Association of Universities and Colleges of Canada (AUCC) and the Association of Canadian Community Colleges (ACCC).

As well, to create pan-Canadian synergies, prevent duplicated effort and generate critical mass, the body funding learning research should ascertain the initiatives under way in the area, investigate existing research, coordinate efforts by Canadian leaders and others in the field, determine where further investment is needed, and target its resources accordingly (*see Rec. 4.8*).

Mechanisms for investing in learnware product development

The organization investing in development of learnware products should be fairly independent of any particular government, aware of the play of market forces, and comfortable with the boundaries between the public and private sectors in education.

Neither federal copyright legislation nor the intellectual property policies of many institutions have kept pace with developments in the digital world or the emergence of e-learning. Changes will be needed to ensure that learners can seize the opportunities created by this new learning environment.

One option would be CANARIE, a private, not-for-profit corporation created and supported by the federal government. CANARIE has been very successful through its own funding program in bringing together institutions and the private sector in online learning projects of strategic importance. As well, CANARIE administers for Industry Canada the SchoolNet Multimedia Learnware and Public Access Applications Program that finances, in conjunction with private sector partners, production of high-quality online learning products and public access on the Information Highway. Other possibilities for disbursing product development could be the CMEC or Industry Canada. Whatever instrument is chosen, it will be necessary to take specific steps to create pan-Canadian synergies, prevent duplicated effort and generate critical mass (*see Rec. 4.9*).

Evaluating impacts and ensuring feedback

In light of this substantial commitment of new funding, it will be very important to evaluate the effectiveness of this research and development effort. A collaborative effort will be needed to develop the necessary measurement tools and metrics (*see Rec. 4.10*). It will also be important to examine systematically the economic and industrial activity surrounding learnware products (*see Rec. 4.11*). An effort should also be made to track the long-term effects of supporting learnware product development (*see Rec. 4.12*).

Copyright and Intellectual Property

Neither federal copyright legislation nor the intellectual property policies of many institutions have kept pace with developments in the digital world or the emergence of e-learning. Changes will be needed to ensure that learners can seize the opportunities created by this new learning environment.

The Advisory Committee urges the federal government to act on a recent AUCC recommendation to revise federal copyright laws so that they do not obstruct, but facilitate, the development of online learning (*see Rec. 4.13*). We also recommend that post-secondary institutions should have in place intellectual property policies for e-learning (*see Rec. 4.14*).

2. Improving Accessibility and Flexibility

Online learning can expand learners' access to post-secondary education and a wide range of information. As well, this new learning environment promises to be extremely flexible, allowing learners to choose where they learn (at home, at work or on campus), when they learn (24 hours a day, 365 days a year), what they learn (from possibly a number of different institutions at the same time) and the pace at which they learn in accordance with ever more customizable online courses and programs. Yet a number of significant obstacles exist to ensuring such flexibility and accessibility in Canada, and our plan calls for measures to overcome them.

Making Connections

High-speed broadband connections are critical to having a minimally satisfactory learning experience with online learning. If Canada is to build the lifelong learning culture so critical to competitiveness in the global knowledge-based economy, then all Canadian post-secondary institutions and learners must have access to a high-speed infrastructure. Through CANARIE's CA*net 3 and SchoolNet, governments and the private sector have already laid the foundations for meeting this ambitious goal.

In the Advisory Committee's view, provincial/territorial and federal governments should work together to build on the CANARIE and SchoolNet foundations, with a view to establishing a fully integrated, high-bandwidth learning network. This high-bandwidth network should:

- link all publicly funded post-secondary institutions by 2001;
- provide anywhere, anytime high-bandwidth access to on-campus learners by 2002;
- ensure high-bandwidth connections are available to all K-12 classrooms, libraries and public access sites throughout Canada by 2003; and
- be maintained at a "state-of-the-art" level into the future (*see Rec. 5.1*).

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- *ensure high-bandwidth connections are available to all K-12 classrooms, libraries and public access sites throughout Canada by 2003; and*
- *be maintained at a "state-of-the-art" level into the future.*

Post-secondary institutions should establish as a goal the construction of their own robust network infrastructures with high-speed connectivity (*see Rec. 5.2*).

Ensuring Affordability

Though e-learning has enormous potential to improve the accessibility of post-secondary educational opportunities, it does not come cheap. Its overall impact must not be to raise the cost of higher learning for learners.

Thus, just as people now receive a tax incentive under the Registered Education Savings Plan (RESP) and a grant to support their children's post-secondary education, Canadians in the labour force should receive a tax incentive to save for their future learning needs through a registered learning savings plan. They should also be able to use RESP savings to meet their own learning needs (*see Rec. 5.3*). Similarly, the federal government should replace the Part-time Canada Student Loan Program with a broader and more flexible Canada learner loan program to provide lifelong learners with loans to meet their learning needs (*see Rec. 5.4*). Within the needs assessment process for the Canada Student Loan Program, the proposed Canada Learner Loan Program and provincial/territorial student loan programs, governments should recognize the legitimate cost of computing hardware, software, Internet services, laptops and other appropriate learnware technologies and tools (*see Rec. 5.5*). Finally, governments should offer incentives to private sector corporations that encourage e-learning for their employees (*see Rec. 5.6*).

Supporting Learners

Post-secondary institutions should provide a full range of technical and other supports to learners to ensure they can take full advantage of e-learning opportunities (*see Rec. 5.7*). The varied needs of persons with disabilities should also be met. Post-secondary institutions, the private sector and governments should ensure that all hardware, software, systems, online courses and learning tools used in online learning are designed so that they meet the varied needs of persons with disabilities (*see Rec. 5.8*).

Achieving Portability

One main advantage of online learning is that it gives learners unprecedented flexibility — enabling them to take online courses from several institutions and thus find the mix that meets their needs. Learners naturally expect full credit toward a degree or certificate for passing these courses. The present accreditation system does not guarantee such a result. To encourage institutions to arrange credit transfers and make learning truly portable across the country, negotiations on credit transfers should be conducted to reach agreements among post-secondary institutions within each province/territory, as well as among provincial and territorial governments at the pan-Canadian level (*see Rec. 5.9*).

3. Creating Pan-Canadian Synergies and Critical Mass

Our vision is to develop, in a relatively short period, the Pan-Canadian Online Learning Service that would provide a comprehensive suite of facilities, services and infrastructure to participating, publicly funded, Canadian post-secondary institutions, their learners and their faculty members. In performing these functions, this service could capture economies of scale, build critical mass and create important synergies that will facilitate and encourage these institutions to offer a significant portion of their programs and courses online. Central to the service's mandate would be a commitment to complement and collaborate with provincial/territorial organizations working in the same broad area (*see Rec. 6.1*).

The service would not itself offer courses, programs, degrees, diplomas or certificates. It would recognize the need for different solutions in different regions of the country and encourage, collaborate with and complement the efforts of provincial/territorial agencies that facilitate and encourage e-learning at the post-secondary level.

The service's activities would fall into three broad categories:

- **Helping learners:** The service would offer learners an opportunity for one-stop shopping on a pan-Canadian basis for, and thus easy access to, a wide variety of information, services and learning resources. Though all learners would benefit, the value added for off-campus lifelong learners unable to visit campuses would likely be greatest (*see Rec. 6.2*).
- **Empowering faculty and institutions in online course and program development:** To build critical mass in course and program development in every region of the country, the service would provide participating institutions and their faculty members by the end of 2001 with ready access to support for instructional design, knowledge about successful pedagogies, learning technologies, libraries of learning objects and discipline-specific resources (*see Rec. 6.3 and Rec. 6.4*).
- **Marketing support:** The service would assist participating institutions by creating critical mass and taking advantage of pan-Canadian synergies to help market Canadian online courses and programs (*see Rec. 6.5, Rec. 6.6, Rec. 6.7 and Rec. 6.8*).

The service would not itself offer courses, programs, degrees, diplomas or certificates. It would recognize the need for different solutions in different regions of the country and encourage, collaborate with and complement the efforts of provincial/territorial agencies that facilitate and encourage e-learning at the post-secondary level. The service would also respect institutional autonomy and be sensitive to the differences between colleges and universities, and the varied circumstances of post-secondary institutions across the country. The service would be responsive to the needs of both English- and French-speaking Canadians (*see Rec. 6.1*).

Ideally, the service should be run by a body responsive to the full range of publicly funded institutions involved in e-learning and other stakeholders. In many ways, the best site would be the CMEC, with its pan-Canadian reach and close relations with provincial/territorial education ministers. Another possibility would be CANARIE, a not-for-profit corporation supported by its members, project partners and the federal government. If neither of these bodies can take on the service, it will likely be necessary to create a new entity. Whatever governance model is chosen, the service should be guided in its activities by a structure that is at arm's length from any specific government and broadly representative of stakeholders (*see Rec. 6.9*).

Participation in the service should initially be open to all publicly funded Canadian post-secondary institutions — and any Canadian consortium to which they belong — that demonstrate a commitment to high-quality online learning (*see Rec. 6.10*). In the short term, participation should be free for such institutions and consortia. At the outset, government should provide seed funding for infrastructure, learner services and marketing, and the service should charge fees for value-added services as these are developed (*see Rec. 6.11*).

A Charter for Learning in the 21st Century

The changes now under way have so many ramifications for education that they have created a need for rethinking the whole learning enterprise — both the respective roles of learners, instructors and institutions, and their relationship to the society and the economy as a whole. If we are to succeed in a global knowledge-based society we must understand this new learning reality and our respective positions in it. This understanding cannot be achieved without considering the viewpoints of all stakeholders and ordinary Canadians. We would, therefore, urge the CMEC to develop a draft charter for learning for the 21st century that provincial and territorial ministers of education could use in consultations with their stakeholders to raise awareness of these new learning realities (*see Rec. 7.1*).

1. A New Paradigm

Profound change faces Canada's post-secondary institutions. This report is about how we can preserve and build upon the best of the past while seizing the opportunities and overcoming the challenges of the future.

The prism through which we view this change is online learning — the use of digital networks to deliver post-secondary education and training — because this new mode of delivery may well prove strategic to Canadians as both individuals and a society. For the global knowledge-based society that was promised in the 1970s is now an inescapable reality in the 21st century. Information — its creation, its acquisition, its adaptation and its dissemination — has become the currency of our time. The intellectual and knowledge resources of our post-secondary institutions have become even more fundamental to our success as an economy and a civil society at the local, regional and national levels. The knowledge they can impart has become crucial to the employability of our young adults, to the future careers of the many Canadians facing a continuing need to learn throughout their lives, to our competitiveness in the global economy, to our ability to participate fully as individual citizens in Canadian society, and to the health of our democracy and our culture.

In light of these considerations, three overriding preoccupations have shaped and guided our deliberations. These are:

- **fostering a culture of lifelong learning as an essential foundation to building a civil and prosperous society in Canada in a knowledge- and innovation-based environment;**
- **harnessing the transformative power of new learning tools to make sure all Canadians can get improved access to the best possible education and lifelong learning opportunities; and**
- **ensuring that Canada's post-secondary institutions and learnware industry are in the best position possible to secure the benefits and avoid the pitfalls of the move to online learning.**

Many of Canada's post-secondary institutions are taking up the challenge of this new environment, but they cannot do so alone and they remain handicapped by our fragmented jurisdictions while institutions in other countries are able to take advantage of national strategies.

This report lays out how provincial/territorial and federal governments, as well as institutions, faculty members, learners and the private sector, can work together on a pan-Canadian action plan to seize the opportunities of online learning by ensuring it enhances the quality of the post-secondary learning experience, improves the accessibility and flexibility of that learning, and creates synergies and critical mass within Canada's post-secondary education system. A welcome consequence will be to launch Canada into a lead position in one of the world's largest new industries — e-learning or online education.

The Knowledge-Based Society

Most observers agree that a knowledge-based society has emerged in the last 25 or 30 years. Many also confirm that a key feature of this new global society is the primacy associated with the exchange over computer-communications networks of intangibles such as knowledge, ideas and intelligence, rather than the tangible goods that have long been the staple of human interaction.

Driving this development has been the omnipresent, ever-improving silicon chip and its many applications in both communications and computer technology. Moore's Law — named after Gordon Moore, the former Chief Executive Officer of chip-maker Intel — has correctly predicted, at least over the last 30 years, that the speed of computers would double every 18 months because of the increasing ability to concentrate computational power on a chip. Because of such technological developments and others, some argue that the capacity of our communications systems is also doubling every 18 months or so.

Convergence is also part of this story — first through the melding of computer and communications technology to create, among many other things, the Internet. The Internet's penetration continues to rise dramatically. By the end of 1999, the number of Internet users worldwide was 196 million and this number is expected to triple to 638 million by 2004.[4] Some observers liken the Internet to a kind of "cyber-nervous system on a planetary scale." In the 1990s, broadcasting and telecommunications services also began to converge and many are now migrating to the Internet.

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[4] Moe and Blodget, *The Knowledge Web*, p. 4.

An early casualty of this metamorphosis has been distance. The new technologies are now rapidly reducing the cost of overcoming distance — and leaping over national borders — as an obstacle to human interaction in the social, cultural, economic, political and educational spheres.

This technological transformation has also given us new and better tools for creating, storing, analysing, displaying and distributing information rapidly around the world. As a result, the cost of networked information continues to fall by about 100 fold every decade. Never before has so much information been almost instantly available in so many different forms to so many different people.

As a consequence, the last few decades represent a watershed in human affairs. Some liken the change to the reverberations spreading throughout European society after Gutenberg's invention of the printing press, which contributed so fundamentally to a rise in literacy, the availability of information and the involvement of vast numbers of people in the discussion of issues and ideas. Others see a resemblance to the Industrial Revolution of the late 18th and early 19th centuries, when steam power replaced human and animal power, setting in motion successive waves of technological, social, economic and political change.

The scale and scope of today's metamorphosis are equally bewildering. Though many have opinions, no one fully understands the larger ramifications of growing numbers of people who have become better informed through the Internet than any previous generation and now expect institutions to respond rapidly to their concerns and needs. Global markets have created global consumers who increasingly feel little loyalty to traditional local brands. Corporations have been quick to respond to this new breed of consumer and in this environment the 21st-century learner is in one sense just another kind of consumer.

As shown below, the challenge to Canadian governments and post-secondary institutions is very real. Yet if they have the vision to anticipate the future and act accordingly, their contribution to Canada's economic competitiveness and civil health as a society will be monumental. As argued in 1998 by UNESCO's International Commission on Higher Education for the Twenty-First Century, chaired by Jacques Delors, "Owing to the scope and pace of change, society has become increasingly knowledge-based so that higher learning and research now act as essential components of cultural, socio-economic and environmentally sustainable development of individuals, communities and nations."[5] In effect, education has become the primary renewable resource and the most sustainable contributor to the social and economic health of our knowledge-based world.

According to a report by Human Resources Development Canada, over 70 percent of the new jobs created in Canada over the next few years will require at least some post-secondary education. The study points out that "Occupations requiring less than high school completion are becoming fewer, while occupations requiring post-secondary training are growing significantly and will provide more job opportunities."

The Growing Importance of Post-Secondary Education

In a global knowledge-based society where the requirements for skills and knowledge are rapidly evolving, learning and the capacity to learn take on fundamental social and economic importance. According to the Information Highway Advisory Council (IHAC) that reported to the federal Minister of Industry in 1995 and 1997, the acquisition of up-to-date knowledge, skills and education will soon determine the success of both individuals and democratic societies in economic as well as social terms.

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In this new environment, the capacity to learn may even be more important than a degree or level of competency acquired from an institution of higher education. For people already working, the need to upgrade and update their education and training may recur several times — five, in the view of the Canadian Labour Market Productivity

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[5] Participants of the World Conference on Higher Education, *World Declaration on Higher Education for the Twenty-First Century: Vision and Action*, p. 1.

[6] Human Resources Development Canada, *Job Futures 2000*.

[7] Brigitte Bouchard and John Zhao, "University Education: Recent Trends in Participation, Accessibility and Returns," p. 29.

Centre — over the course of their careers. It was because of this reality that IHAC insisted in 1995 and again in 1997 that "lifelong learning" must be "a key design element of the Information Highway."

Much has been written in the last few years about the brain drain and the growing importance of skilled labour and online learning to the competitiveness of companies and entire societies in a global, knowledge-based society where anyone can compete in anyone's backyard. Most observers agree with U.S. Treasury Secretary Lawrence Summers when he states, "If investments in factories were the most important investments in the industrial age, the most important investments in the information age are surely investments in the human brain."[8] One of our major themes here is that prospects for a high quality of life in Canada will depend on having a population that is caring, adaptable, resilient, educated to the highest possible level and ready to learn throughout life.

As the Business Council on National Issues noted in April 2000, "In the past, money followed resources. Today, it follows people. Canada's well educated workforce is a significant competitive advantage, but despite our intensive spending on education, major challenges remain. From early childhood development through the school system, post-secondary institutions and workplace training, Canada can and must do better. Greater access to lifelong learning is the key to equality of opportunity within our society, to the survival of our country and to the prosperity of our communities."[9] It is also important not to lose sight of the reality that lifelong learning will be as crucial to social and economic development in rural and remote areas as it will be in our cities.

The challenge is enormous. Building a lifelong learning culture means convincing people, whatever their income or cultural background, that learning is now fundamentally important to their success in life. It involves making sure that people understand that learning is not just a one-time experience but an activity that must continue throughout life. The key instruments we have to create this attitudinal change and give people a capacity to learn are early childhood education, K-12 schooling and our post-secondary institutions. We must also look to new learning and teaching innovations such as online learning to excite people about the importance of learning and to make high-quality learning experiences available to all Canadians. Finally, we must use the online learning technologies to make lifelong learning accessible to Canadians in every walk of life and in both urban and rural and remote areas.

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[8] Quoted in Moe and Blodget, *The Knowledge Web*, p. 232.

[9] Business Council on National Issues, *Winning the Human Race: Developing and Retaining World Class Talent.*

> *Is Canada keeping up? According to Linda Harasim, of Canada's TeleLearning Network of Centres of Excellence, and a professor in communications at Simon Fraser University, the answer may be no: "Canada needs to increase student access to higher education dramatically and to add more leading-edge disciplines — including new models of learning for ongoing knowledge building. Canada is not generating enough university graduates — 17 percent of the population versus 25 percent in the United States — and not enough of them are graduating . . . in the 'critical disciplines' the economy needs."*

According to Linda Harasim, of Canada's TeleLearning Network of Centres of Excellence (TeleLearning NCEs), and a professor in communications at Simon Fraser University, "Canada needs to increase student access to higher education dramatically and to add more leading-edge disciplines — including new models of learning for ongoing knowledge building. Canada is not generating enough university graduates — 17 percent of the population versus 25 percent in the United States — and not enough of them are graduating . . . in the 'critical disciplines' the economy needs."[10]

Less often recognized than these economic imperatives is the reality that our communities and social and democratic institutions must also respond to the complex and swiftly changing realities of this new environment. We believe that the emergence of a universal culture of lifelong learning will be critical to their survival in future, as well as to Canadians' meaningful participation in a Canadian democracy facing similar challenges.

In light of this new reality, education as a one-time initial experience in life is no longer sufficient. A cultural shift is needed to encourage lifelong learning and promote increased access to educational opportunities. Knowledge has become a crucial factor in the economic and social development of all societies. Universities and colleges must play a new and expanded role in the ongoing education of citizens.

The New Shape of Learning

Growing numbers of young people in their late teens and early 20s — the demographic echo of the postwar baby boom — are causing post-secondary enrolments to swell in Canada. Many of these young persons have been shaped by the increasing availability of the Internet in the 1990s. They expect alternatives to large classes and more personalized and learner-centred forms of learning analogous to the kinds of experiences they have had in virtual communities on the Internet.

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[10] Linda Harasim, *A Canadian Virtual University: Models for an Online National Learning Network*, p. 4.

At the same time, lifelong learners, mostly adults with job and family commitments, often find it difficult to attend classes on campus, and demand flexible learning opportunities at home or work that can be adapted to their busy schedules.

Online learning represents a way of meeting these demands. But what is it? Online learning can be defined as what occurs when education and training (typically credit but also non-credit) are delivered and supported by networks such as the Internet or intranets. Learners are able to learn any time and any place. In this report, we use the terms "online learning" and "e-learning" interchangeably. In either case, we mean both distance learning and the provision of technology-enhanced learning within a traditional classroom, lecture hall or lab.

Moe and Blodget in their recent report for Merrill Lynch define nine features that characterize online learning when the digital medium is fully exploited. They believe that, for success, online learning must:

- offer an expert-rich content and curriculum;
- be easy to use;
- be flexible and convenient;
- involve continuous assessment;
- allow real-time feedback, tracking and metrics;
- use multimedia simulations;
- employ rich case studies;
- permit threaded discussions;[11] and
- create a dynamic, engaging environment for learning.[12]

Though this list of features is a little too specific to fit all cases or the new kinds of opportunities that may be created by rapidly evolving learning technologies, it does give a flavour of some of the features required for a high-quality e-learning experience.

For most traditional on-campus students in their late teens and early 20s, online learning, used effectively, can provide a useful and enriching complement to traditional classroom teaching. One of our overarching themes is that online learning should not replace traditional modes of education, but should be used to nourish a more active student-centred learning on campuses. The use of e-mail, discussion forums and multimedia interactions among instructors, learners and mentors can encourage the emergence of virtual learning communities, personalize the campus learning experience and enrich it by allowing students to reach beyond it. In this way, e-learning can prepare students for a work world where employers will expect them to learn continuously, often at a distance.

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[11] See glossary.
[12] Moe and Blodget, *The Knowledge Web*, p. 185.

For many lifelong learners, especially adults with family and job commitments, online learning may represent their only chance to obtain the higher education opportunities they need to compete and survive in a labour market driven by the demand for new knowledge and skills. Online learning, properly implemented, should allow them to take courses at home, at work or at one of the 10 000 community access sites in rural and remote communities and urban neighbourhoods across the country. Ideally, e-learning should let them choose among different Canadian institutions to find the precise mix of courses that will give them the accreditation and competencies they need. Equally important, online learning can potentially make it easier to customize courses in light of the needs of individual students.

In this way, e-learning has the potential, if properly implemented, to address one of our fundamental concerns here — making sure Canadians can take advantage of learning opportunities throughout their lives. At present, though Canada's system of post-secondary education is of high quality, it does not reach all citizens. We believe that online learning can significantly expand access. In short, **e-learning should help make equality of opportunity a growing reality for all Canadians.**

Yet many faculty members and learners question the efficacy of online learning. Some wonder whether something will be lost if the electronic knowledge tools of e-learning dominate in higher education. They worry that the Internet enables undisciplined searches in a poorly indexed chaos rather than genuine research. They are concerned that hypertext documents are too loosely organized to encourage the kind of rigorous analysis and critical judgment that should be a part of post-secondary education. They worry about the role of the truly inspiring teacher in this new environment. They wonder whether students will turn into electronic hermits and lose all the benefits from socialization face-to-face with instructors and fellow students.

Some of these concerns arise from an insufficient understanding of learning processes. We are convinced that, for the new online tools and methods to be applied most effectively, we must invest in research on learning and on new teaching methods.

Other concerns have some validity. While the virtual learning communities of the new environment can advance a certain type of socialization, face-to-face interaction is critical for some learning experiences. Most students also benefit more from face-to-face interaction with instructors. But both observations only apply if instructor–learner ratios do not climb too high, and this possibility is a real danger in the next few years because of the demographic echo from the baby boom. In these circumstances, e-learning, particularly technology-enhanced learning environments, represents an important and necessary way to sustain and enrich the on-campus learning experience — as well as a way to meet the learning expectations of a new generation of students who grew up with the Internet. For many mature lifelong learners, online learning may represent the only way to gain access to the knowledge and skills they will need.

Other worries about low-quality e-learning sweeping away everything valuable and good in post-secondary education do not seem to be well supported. Because no one is advocating the disappearance of traditional lecture halls and classrooms, a truly inspiring lecturer will always find a place in higher education. Though the chaos continues to grow on the Internet, so too does the robustness of search engines and digital information resources, as well as the bandwidth available to support ever more imaginative and creative learning tools. Finally, it is the intellect, passion and ingenuity that teachers bring to the vocation of teaching in both a real and virtual classroom that truly makes for effective learning. It is the purpose of this report to ensure that these qualities can be exercised as fully in the design of an online course, and in mentoring through e-mail and multimedia interaction, as in the traditional classroom. Indeed, the Advisory Committee's object is to ensure that each medium of learning can be used to enrich the other.

Recommendation

1.1 Online learning should be deployed and used in such a fashion as to support and enrich traditional learning on campuses and to encourage new forms of technology-mediated teaching and learning at a distance from home or work.

-14-

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Directions for the Future

As we emphasize in Chapter 4, a concerted research effort will be needed to determine how e-learning can ensure the highest-quality learning experiences for many different kinds of learners. We are in a period of history when new tools based on information and communications technologies have the potential to advance learning dramatically and make it more accessible. As is the case with all new and powerful tools, these must be used with care and understanding. Online learning must not result in a diminution of quality, and it must be introduced in a manner that gains public acceptance and supports faculty members at our institutions of higher learning. For this reason, the first focus of any online learning initiative — including our own action plan, described below — must be the quality of the learning experience.

In the fifth century B.C., Plato predicted that the invention of writing would weaken the oral tradition that sustained poets such as Homer. Yet poetry is still alive and well 2500 years later. Similarly, 500 years ago many believed that the invention of printing, by making intellectual creations easily available, would dry up the springs of intellectual creation by ending a long-standing tradition of oral debate and expression. As we look back over the last five centuries from the vantage point of our knowledge-based society, a decline in intellectual vitality is more than a little difficult to discern, though certainly there may have been changes in some aspects of intellectual life. In fact, the existence of today's knowledge-based society is in part a testimony to the enormous intellectual energy of the last 500 years. No one would seriously argue today that the intellectual enterprise or teaching have suffered because of the invention of writing or printing.

The new knowledge tools represent similarly revolutionary technologies, and we ignore them at our peril. Their potential is also clear. Online learning will be central to fostering the lifelong learning culture that will be essential to sustaining a civil and prosperous society in 21st-century Canada. But these benefits will only be realized if the quality and accessibility of the e-learning experience are top priorities.

2. Opportunities and Challenges

The emergence of online learning creates spectacular opportunities for Canada's post-secondary institutions, many of which are pioneers in this area and have excellent reputations around the world. However, new global players — both leading institutions and major corporations — are now rushing into e-learning, posing a potentially competitive threat to Canadian institutions that still face many obstacles. The price of inaction is less a question of lost markets — though markets will be lost — than one of ensuring that the provision of the higher education and lifelong learning opportunities continues to centre on Canadian cultural and social values, and responds to the concerns and economic development priorities of local, regional and national communities.

Global Opportunities — Canadian Strengths

The forces giving lifelong learning its new prominence here in Canada are operating around the world, creating a rapidly expanding market for online learning. Canada has significant strengths that, if built upon, could give us significant advantages in this growing world market.

According to John Chambers, Chief Executive Officer for Cisco Systems, "The next bigger killer application for the Internet is going to be education."[13] Moe and Blodget, in their May 2000 report, highlight a number of indicators of the size of the world e-learning market and its dramatic potential for growth.

- At the end of 1999, more than 196 million people were using the Internet worldwide. The number of global Internet users is expected to more than triple to 638 million by 2004.
- Knowledge services — education and corporate learning for the new economy — is a $740-billion industry in the United States and a $2-trillion industry globally.
- "At no previous time has human capital been so important, meaning finding, developing and retaining knowledge workers will be mission-critical functions — and high growth sectors — in the new economy."[14]

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[13] Quoted in Moe and Blodget, *The Knowledge Web*, p. 11.

[14] Moe and Blodget, *The Knowledge Web*, pp. 4, 10.

A survey, conducted by Campus Computing International (Canada) between March 1999 and May 2000, but using a more stringent definition of online learning than our own, revealed that 57 percent of Canada's 134 colleges and universities offer online courses. The institutions offer almost 3000 such courses altogether, ranging from one to 340 such courses for each institution. In effect, we are now among the world leaders in online learning, and several Canadian post-secondary e-learning initiatives are on the cutting edge.

Canada is well placed to take advantage of this opportunity. Our position as a bilingual and multicultural country, as a Pacific nation with a neighbour's view of the American experience, makes it easier for our post-secondary institutions to develop online course offerings with appeal to learners in the United States, Europe and Asia. Canada also has an excellent reputation for high-quality, culturally neutral content.

Most Canadian post-secondary institutions are eager to seize the opportunities presented by e-learning. They are also respected around the world for their scholarly achievements, innovation and low cost. As well, because our population is scattered across a vast area and divided by barriers of geography and climate, our institutions have been pioneers in distance education. One consequence is that considerable Canadian learning materials for online learning already exist. Another is that Canada's colleges and universities are world leaders in providing cost-effective accessibility to post-secondary education. They graduate large numbers of well-educated students at less cost per student than in most other industrialized countries.

Many of our institutions have also started to make significant use of e-learning. A survey, conducted by Campus Computing International (Canada) between March 1999 and May 2000, but using a less stringent definition of online learning than our own, revealed that 57 percent of Canada's 134 colleges and universities offer online courses. The institutions offer almost 3000 such courses altogether, ranging from one to 340 such courses for each institution.[15]

In effect, we are now among the world leaders in online learning, and several Canadian post-secondary e-learning initiatives are on the cutting edge. A number of these achievements are described in Appendix A.

Canada also has a young but rapidly growing industry providing training opportunities and producing learning materials for new media. Its members tend to have a high level of technical capability and operate at the juncture of the software, multimedia and educational domains. Canadian training companies now provide a wide range of high-quality training products and services to both domestic and foreign markets. Software and multimedia companies throughout Canada have demonstrated the ability to produce creative, effective and interactive training applications that they sell nationally and internationally. Often they have built their businesses up in the competitive American market and thus have the potential to compete globally. As well, Canada's rapidly growing broadband networks have facilitated cooperation among industry members, creating a kind of virtual critical mass. These networks have also helped support an early transition to the production of online learning materials and have reduced the cost of access to international markets.

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[15] Carl Cueno et al., *The Underbelly of Online Learning in Canadian Post-Secondary Education*, p. 5.

In fact, key portions of the high-speed networks needed to support even more ambitious e-learning initiatives by post-secondary institutions are already in place. In the last year, CANARIE completed CA*net 3, the world's fastest advanced Internet backbone linking major urban centres in all 10 provinces.

> **"The Conference Board projects that networked learning will experience the greatest growth with the percentage of (corporate) organizations using intranets rising from 25 percent in 1997 to 76.3 percent in 2000 and the percentage using extranets projected to grow from 26.4 percent to 70.1 percent."**
>
> Conference Board of Canada
> March 2000

Canada's telecommunications infrastructure as a whole is also generally regarded as one of the finest anywhere and provides a firm foundation for online learning initiatives. A larger proportion of Canadians than residents of most other countries is also in a position to take advantage of such initiatives. According to Statistics Canada, 42 percent of Canadian homes had Internet access in 1999 — up from about 36 percent in 1998.[16] An American Express survey released in October 2000 found that 60 percent of Canadians had Internet access at home, work or school.[17] In the view of Omnia Communications and POLLARA, Canada is way ahead of the United States in the deployment and adoption of new broadband services. The two companies predicted that, by the end of 2000, 17 percent of Canadian online homes would have a broadband connection, compared to around 9 percent in the United States.[18]

Through Industry Canada's SchoolNet program, our country became, in March 1999, the first in the world to connect all its schools and libraries to the Internet. Through the Community Access Program,

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16. Statistics Canada, "Household Internet Use, 1999."
17. American Express, "The World Is a Small Place When It Comes to Online Attitudes and Actions: New American Express Survey Shows Universal Consumer Perspectives About the World Wide Web."
18. See John Partridge and Showwei Chu, "Poor won't fuel Net growth: study — Toronto research firms say biggest surge in Internet use will come from the middle class."

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the federal government has nearly met its target of placing 10 000 community access sites in urban neighbourhoods and rural and remote communities to provide universal accessibility to the Internet. Through Canada's Campus Connection, a program delivered through SchoolNet, a wide range of information on Canadian online courses and course calenders, as well as access to various kinds of advisory services, is made available online to federal public servants. SchoolNet's NoteMakers program allowed provincially chartered Canadian institutions to hire young people to assist with the development of online learnware. As a result of such achievements and others, the Conference Board of Canada, in its first composite index on connectivity, ranked Canada second to the United States in connectedness.

Competitive Challenges — Canadian Obstacles

Though Canadian institutions have taken important strides to seize the opportunities presented by e-learning, they face significant competitive challenges. They must also overcome serious obstacles if they are to move further into the online learning environment.

The Global Playing Field

The very size and growth rate of domestic and global e-learning markets have attracted the interest of national governments, large transnational corporations and many of the leading post-secondary institutions in the world. They have set their sights on markets around the globe, including that represented by Canadian learners familiar with the Internet.

> "The company that owns the University of Phoenix raised $70 million from investors on Wall Street last month in a stock offering tied directly to the company's distance-education unit. The deal is being widely watched in education and finance circles because it is the first market test of a public offering of stock in a distance-learning institution. The parent company, the Apollo Group, raised the money by issuing five million shares of a so-called tracking stock, which are tied directly to the performance of the company's University of Phoenix Online division."
>
> Goldie Blumenstyk
> *The Chronicle of Higher Education*
> October 13, 2000

As a consequence, "Educational organizations are increasingly adopting Distributed Learning Strategies to support learner needs across all levels of the educational process," state Moe and Blodget in their report for Merrill Lynch. "This two trillion dollar global education and training industry is going through radical changes. Megatrends such as demographics, the Internet, globalization, branding, consolidation, and outsourcing all play major roles in this transformation."

New organizational forms are emerging to serve this expanding market. These range from new virtual post-secondary institutions, domestic and international consortia of prestigious post-secondary institutions, innovative ventures with large transnational corporations, profit-making spinoffs from major institutions, and so on.

A few of these innovative approaches are described in Appendix B, but Universitas 21 may well be a prototypical example. It is an alliance of 18 major universities — including three Canadian ones (McGill University, University of Toronto and University of British Columbia) — from 10 countries. It has just concluded an alliance with Thomson Learning, a division of the Thomson Corporation. Collectively, the institutions in the alliance now enrol about 500 000 students a year, employ around 44 000 academics and have combined operating budgets of around US$9 billion. According to the Universitas 21 Web site, "As an incorporated entity, Universitas 21 is in a position to leverage the reputation, resources and experience of its members on behalf of corporate partners. Universitas 21 is therefore uniquely placed to address the cross-jurisdictional branding requirements of new educational providers."[19]

National governments are also starting to develop major initiatives in this area.

For example, the British government has decided to build on the enormous success of the UK Open University, which now enrols 21 percent of all part-time post-secondary students in the country and has more than 200 000 people studying with it online. The government has commissioned a business plan for a major international "e-university" involving a collaboration among leading British universities to offer online instruction at the bachelor's degree level, with a view to improving Britain's share of the international student market and meeting competition from major virtual universities being developed in the U.S. According to David Walker in the May 2000 *The Chronicle of Higher Education,*

> "Universities are autonomous institutions, and rightly so. But in the knowledge economy, entrepreneurial universities will be as important as entrepreneurial businesses. The 'do nothing' universities will not survive — and it will not be the job of government to bail them out. Universities need to adapt rapidly to the top-down influences of globalization and the new technologies, as well as the bottom-up imperatives of serving the local labour market, innovating with local companies, and providing professional-development courses that stimulate economic and intellectual growth."
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[19] Universitas 21. http://www.universitas.edu.au/introduction.html

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[19] Universitas 21. **http://www.universitas.edu.au/introduction.html**

"The business plan is a key step toward creation of the new online university, which Labour Party officials hope will help realize a promise by Prime Minister Tony Blair: to enrol at least half the country's young people in higher education by the time they are 30 years old."

Are Canada's post-secondary institutions ready to meet these emerging competitive challenges? Despite their strengths and Canada's advantages, the answer for now is no — unless something is done. In fact, 43 percent of Canadian colleges and universities still offer no online courses. Many of these are the smaller institutions that will be most vulnerable to the challenge from abroad. But even those institutions that have undertaken pioneering initiatives face serious obstacles.

The United States is also moving toward a more systematic national approach to this whole area. The Web-based Education Commission was established by Congress in 1999 to develop specific policy recommendations geared toward maximizing the educational promise of the Internet for pre-kindergarten, elementary, middle, secondary, and post-secondary education learners. According to the Commission's Web site, "The 16 members of the Commission — appointed by President Clinton, Education Secretary Richard Riley, and the Democratic and Republican leadership of Congress — have been meeting with hundreds of education, business, policy and technology experts. Our overarching goal is to establish a 'policy roadmap' that will help education and policy officials at the local, state, and national levels better address the critical 'digital age' challenges brought about by the Internet and other emerging technologies. The Commission seeks broad public input on the key issues and potential resolutions affecting the use of the Internet for learning. The Chair of the Commission is Sen. Bob Kerrey of Nebraska. The Vice Chair is Rep. Johnny Isakson of Georgia. Together they are leading a one-year effort that will yield a comprehensive — and bold — report to Congress and the President by the end of November 2000."[20] Meanwhile, large private sector players in the United States recently formed the Online Learning, Training and Research Association to provide a more effective lobbying effort in Washington.

Canadian Obstacles

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20. Web-based Education Commission, http://www.hpcnet.org/webcommission
21. Cuneo, *The Underbelly of Online Learning*, p. 9.

For example, difficult issues related to the ownership of online courses and their relevance to tenure and promotion decisions remain unresolved in Canada. As a consequence, many faculty members and some administrators are hesitant about getting involved in e-learning and worry about its larger implications for their institutions.

As well, the initial investments required to launch competitive online learning initiatives and build the necessary infrastructures are beyond what many smaller institutions and even larger ones can afford, acting alone. The development of high-quality online courses is expensive, especially in the quantity required to be competitive.

Unfortunately, the Canadian environment in which these institutions operate tends to discourage the creation of consortia and other forms of cooperation needed to overcome such obstacles. For example, the formulae used by many governments to fund post-secondary education encourage Canadian institutions to compete against each other for learners — especially when these are from another province or territory — and provide disincentives to collaboration or cooperation.

Attempts are being made to overcome these difficulties and build consortia. For example, the faculties of engineering across Canada have considered joining forces to develop a core curriculum in engineering, but lack of funding has inhibited progress. In Quebec, the Conference of Rectors and Principals of Quebec Universities (CREPUQ) has developed a proposal for a province-wide consortium of universities to produce online courses.[22] This proposal is awaiting Quebec government funding.

Given the size of some of the international institutions, consortia and corporations competing for Canadian learners, only a cooperative pan-Canadian effort will generate enough critical mass, and economies of scale and scope, to compete. But in a country with multiple educational jurisdictions it is no easy task to achieve such a level of collaboration, especially on the myriad of difficult issues facing online learning.

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[22] Sous-comité des technologies de l'information et des communications, *Société pour la production et la valorisation du multimédia pédagogique universitaire.*

The lack of pan-Canadian approaches to marketing and standards has also inhibited the development of Canada's innovative learnware industry. Many of the companies in the industry are comparatively small, without the investment capital for learnware development possessed by their larger American and European counterparts. In the absence of more cooperation or a large industry-wide association such as recently emerged in the United States, it is also difficult for individual members of the Canadian industry to lobby government or provide across-the-board solutions to large companies or ministries of education seeking solutions for a wide spectrum of educational needs.

In addition, though Canada's telecommunications system is generally regarded as one of the world's finest and provides as solid a foundation for e-learning initiatives as any, the system does have its limitations. As in other countries, a considerable "have–have not" split exists. According to Andrew Reddick in a study prepared for Industry Canada, "the levels of awareness and the use of these new technologies and services are highly polarized along social class and generational lines, creating a digital divide."[23] Though the Community Access Program is closing this gap, the existence of this divide constrains the number of Canadians who can benefit from online learning and provide a domestic base of learners for Canadian post-secondary institutions. The constraint becomes even more severe if the criterion becomes not simple dial-up Internet access, but the new forms of high-speed access that can provide a higher-quality e-learning experience for students.

Access can also present difficulties for entire institutions. For example, CA*net 3 may be the world's fastest advanced Internet backbone, but it is still only connected to around a quarter of institutions. In most provinces, local providers of telecommunications services are responsible for linking institutions to the network, and institutions must bear the considerable cost. Alternate models do exist, as illustrated by the Quebec Scientific Information Network (*RISQ*), which provides high-speed connections at a very low cost to all post-secondary institutions in Quebec. But these models have yet to be adopted throughout Canada.

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[23] Andrew Reddick, *The Dual Digital Divide — The Information Highway in Canada,* p. 5.

Despite these problems, the foundations for seizing the opportunities, both globally and domestically, of this new online learning environment already exist in Canada. The institutions themselves are eager to advance and many have launched ambitious initiatives. However, only a concerted pan-Canadian effort can remove the significant remaining obstacles. In the absence of such an effort, our institutions and our learnware industry will face a severe competitive challenge — one that will put some institutions at risk and seriously handicap the future development of others. Those left behind will not be just the institutions but individual Canadians and Canadian communities, as well as our prospects for remaining competitive in a global knowledge-based society.

According to Richard Katz, Vice-President of EDUCAUSE, a Colorado-based association focussing on the intersection between higher education and information technology, "Some colleges and universities might disappear. Some might actually acquire other institutions. One might even imagine a Darwinian process emerging, with some institutions devouring their competition in 'hostile takeovers.' " In other words, it is conceivable that some Canadian institutions might disappear or be expatriated or seriously weakened.

The Price of Inaction

If we do nothing, online learning will still come to post-secondary education in Canada. But it will increasingly be provided to Canadian learners by foreign institutions and corporations that will be responsive only to global market forces and their own domestic exigencies.

The issue is much more than markets gained or lost. It is a question of the continued health of our post-secondary institutions. Some analysts believe that post-secondary institutions that do not adapt to this e-learning challenge could face declining enrolments and consequently smaller grants from government and therefore less capacity to fulfil their role as an intellectual resource and educator for Canadian communities. According to Richard Katz, Vice-President of EDUCAUSE, a Colorado-based association focussing on the intersection between higher education and information technology, "Some colleges and universities might disappear. Some might actually acquire other institutions. One might even imagine a Darwinian process emerging, with some institutions devouring their competition in 'hostile takeovers.' "[24] In other words, it is conceivable that some Canadian institutions might disappear or be expatriated or seriously weakened.

Now some might argue that such losses would be acceptable as long as market forces in the form of foreign institutions and corporations could fill the gaps. We do not believe that these gaps can be so easily filled. Canada's institutions have evolved over the years in response to the needs and priorities of Canadian governments, as well as local, regional and national communities. Canadian society, local economies and the national economy are intimately dependent on the health of these institutions. Foreign institutions and corporations respond to global markets and the needs and concerns of their own domestic communities. There is no reason to expect them to be nearly as responsive as Canadian institutions to Canadian values or the evolving priorities and concerns of Canadian governments and communities.

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[24] Katz, *Dancing with the Devil*, p. 15.

Our Expectations of Post-Secondary Institutions

In 1999, after a lengthy consultation, the CMEC Consortium on Public Expectations for Postsecondary Education set down five key functions that it expected our post-secondary institutions to perform. These are:

- to inspire and enable individuals to develop their capabilities to the highest potential levels throughout their life (for individual growth, self-sufficiency and fulfilment, and for effective contributions to society and the economy);
- to advance, preserve and disseminate knowledge and understanding;
- to serve the learning and knowledge needs of an adaptable, sustainable knowledge-based economy at local, regional and national levels;
- to foster the application of knowledge and understanding to the benefit of the economy and society; and
- to help shape a healthy, democratic, civil society.[25]

These functions extend well beyond the imparting of knowledge, and their successful performance requires close links between the institutions and Canadian society at all levels.

The Economic Price

Consider the economic dimension of these functions.

Foreign institutions won't help individuals develop their capabilities to make effective contributions to the Canadian economy. These institutions won't serve the learning and knowledge needs of an adaptable, sustainable, knowledge-based economy at local, regional and national levels in Canada. Nor will they foster the application of knowledge and understanding to the benefit of the Canadian economy.

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[25] Council of Ministers of Education, Canada, ***A Report on Public Expectations of Postsecondary Education in Canada***, pp. 4, 5.

The performance of these functions requires close links with local governments and the private sector. No doubt foreign institutions will maintain such intimate connections with their own governments and private sector, but their bonds with Canadian governments and Canada's private sector will not likely be anywhere as close as those of Canadian institutions.

> **"... universities play a vital role in knowledge ecologies. These ecologies have a distinct regional character. Submitting students to the curriculum of the global village may neglect the needs of the ecology. There are good reasons why the University of California at Davis has a strong enology [sic] department** (it's close to the Napa **Valley), UC Berkeley has a strong computer science department** (it's close to Silicon **Valley), and UC Los Angeles has a strong film department** (it's close to Hollywood). **A policy of regional devolution is important if regions are to develop their own strengths supported by universities."**
>
> **John Seely Brown and Paul Duguid**
> ***The Social Life of Information***

If a foreign institution carries out recruitment efforts, it will likely be for the private sector back home, thereby increasing the brain drain from Canada. Certainly, such institutions will not in all probability be as responsive to the learning and knowledge needs of Canadian businesses at the local, regional and national levels as are Canadian institutions that depend upon such businesses for support and are constrained to be responsive by government policies. As well, foreign faculties residing in other countries will not have much interest in developing applications of knowledge and technologies to address Canadian needs and build competitive advantages for Canadian companies. These are all activities that Canadian institutions now perform because they are an integral part of Canada's economic community and are subject to the policies of Canadian governments. All of these activities are critical to our international competitiveness.

The Social Price

Similar concerns are apparent on the social side.

Foreign institutions will not inspire Canadian learners to develop their capabilities for making an effective contribution to a distinctively Canadian society. Rather, the values, concerns and institutions of their parent society, or some homogenized global common denominator, will prevail. Faculty members from other countries are not likely to expend much effort outside the classroom advancing, preserving and disseminating knowledge and understanding within the borders of Canada, as many Canadian faculty members routinely do. Mostly,

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It is unrealistic to expect from foreign institutions and faculties the same kinds of contributions to Canadian society that Canadian institutions and faculties have made as a matter of course for decades because of their intimate involvement and immersion in this society.

Missed Opportunities

The price of inaction will also be evident, not only in damage to Canadian institutions and their capacity to contribute to Canada economically and socially, but also in missed opportunities.

Canadian institutions are eager to move aggressively into online learning, and many have already undertaken bold new initiatives in spite of insufficient resources. If the present obstacles to further advancement are removed — many of which revolve around lack of resources and Canada's multiple educational jurisdictions and fragmented educational market — then our institutions will be able to build a lifelong learning culture in Canada and make sure all Canadians have access to lifelong learning opportunities. Our institutions also have a reputation for high-quality content and cultural neutrality that gives them an important competitive advantage in the burgeoning global learning market.

These are opportunities that must not be missed. They will be crucial to our economic competitiveness and health as a civil and democratic community in the 21st century.

The time for action is now.

The First Step

As the pre-eminent centres of knowledge in our society, our post-secondary institutions represent key strategic resources for Canada. Their contributions extend far beyond the simple transmission of knowledge to students, and they are more important now than they have ever been to our economic competitiveness as a nation and our health as a civil and democratic society. Foreign institutions and corporations simply cannot make the same level of contribution, essentially because they are much less subject to the policies of Canadian governments, lack our own institutions' close ties and commitments to the Canadian social and economic community, and will inevitably be more responsive to their home countries' concerns and priorities at Canadian expense. For all these reasons, it would be folly to weaken through inaction Canadian institutions in the frail hope that market forces will persuade foreign institutions and corporations to serve Canadian social, economic and government objectives.

Canadian institutions must become more competitive as the educational market grows more flexible and students acquire far greater access to education and choice. To this end, support for post-secondary education should be commensurate with the crucial role it will play in sustaining economic growth and a civil society in Canada. The need exists not only for a new and greater appreciation by governments of the importance of higher learning in this new environment, but also for a re-investment by them in post-secondary education. Finally, if learning is the key to individual success in this new knowledge-based society, then governments must make sure many more Canadians have access to post-secondary education.

Recommendation

2.1 Provincial/territorial and federal governments should re-affirm the fundamental importance of initial and continuing post-secondary education as an agent of change and social and economic development in the knowledge-based society by augmenting investment in such education and expanding access to it.

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3. A Framework for Action

The task facing us is in some ways analogous to the nation-building efforts undertaken by Canadians during the last three decades of the 19th century and the early 20th century. In that era of growing mass migration, manufacturing expansion and resource extraction, the challenge was to build an infrastructure that would move people, manufactured goods and primary products across the vast expanse of this country. The result was two transcontinental railroads.

The Infrastructure for the Knowledge-Based Society

Now our job is to move to the next stage in building the infrastructure for a knowledge-based society. In an age governed by the rapid creation, acquisition, analysis and dissemination of information, it will be critical to ensure Canadians are in a position to acquire knowledge and possess both the capacity and the opportunity to learn throughout their lives.

We must develop a culture that supports lifelong learning, where post-secondary institutions provide an intellectual context for living, the skills needed for success in the present knowledge-based society, and the capacity to learn throughout life. The role of post-secondary institutions must not be simply the transmission of information; they must also teach us how to learn. As Peter F. Drucker has noted, the reason is simple: "Today knowledge has power. It controls access to opportunity and advancement."[26] We might add that this observation is true not just for individuals but for communities, regions, societies, public institutions and companies.

Here in Canada, the foundation for this knowledge infrastructure is already in place in the form of post-secondary institutions with a worldwide reputation for quality and an innovative multimedia industry. E-learning represents a means to build upon that foundation by enriching the quality of post-secondary learning, extending it beyond the campus to where Canadians live and work, and creating new synergies and greater critical mass within post-secondary education.

Post-secondary institutions, in partnership with industry where appropriate, must assume a role as key agents of regional and national economic development by enabling continuous skill improvement by

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[26] Peter F. Drucker, "Beyond the Information Revolution," p. 56.

Canadians. They must be sustained in their roles as vital contributors to the health of our civil society, the energy of Canadian culture and innovation in communities across the country.

Some may object to the federal government playing any role at all in this arena. But the national interest is clear. The health of our post-secondary institutions and the potential of e-learning to make new lifelong learning opportunities available to all Canadians are crucial to regional economic development and diversification as well as to the economic health of communities across the country. The federal government is also concerned that our post-secondary institutions and learnware industry be able to capture a significant portion of the burgeoning global market for learning.

To meet these ends, we are putting forward a pan-Canadian action plan to accelerate the use of online learning in post-secondary education and in lifelong learning. The major responsibilities for carrying this plan forward will inevitably rest with provincial/territorial and federal governments and post-secondary institutions themselves. But it will not succeed unless a special effort is made by them to involve our most important educational stakeholders — faculty members, support staff, learners, the larger community and the private sector — in the implementation of e-learning.

Recommendation

3.1 To enhance the development and evolution of higher learning, provincial/territorial governments, the federal government and post-secondary institutions should collaborate to:

a. accelerate the use of online learning in post-secondary education and for lifelong learning; and
b. encourage the participation of faculty members, support staff, learners, the larger community and the private sector in the implementation of online learning.

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In pursuing these concerns, the federal government can bring important assets to the table — its authority over telecommunications and its major investments in national communications infrastructure through CANARIE, the SchoolNet program, the Community Access Program and other programs. There is also the possibility of future investment to meet the demands for a skilled and knowledgeable work force. Federal government departments such as Industry Canada, the Department of Foreign Affairs and International Trade, Human Resources Development Canada and Canadian Heritage have

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In fact, the matter is so urgent, and so important to our future health as a society and economy, that this shared involvement is the only realistic approach.

A Vision for the Future

We have a vision of what could be achieved within five years.

By 2005, the learning infrastructure for a knowledge-based society will be built in this country, providing the strongest possible foundation for our prosperity and our health as a democratic society. The engine of innovation and economic growth and the source of our social vitality will be the informed and creative minds of Canadians who in their youth and in their maturity have equitable and affordable access to the high-quality post-secondary learning opportunities they need.

The virtual classroom will provide a learning experience of high quality, using technology that is easy for anyone to use. These improvements will stem from the ever-expanding depth and breadth of knowledge in our colleges and universities, the innovation unleashed by online learning, the passion and skill of our online instructors and mentors, our serious commitment to learning research and development, our setting of quality standards for e-learning, the dynamism of virtual learning communities, and the continuing evolution of the technology. These will bear fruit in an online learning experience that is enriching, deep and varied, and capable of passing on both the most basic skills and a capacity for critical judgment and reasoning.

Learners, whatever their incomes and cultural backgrounds, will find the post-secondary learning opportunity most suited to their individual needs, situation, income, language and learning styles, whether online at home or work, or face-to-face in a traditional campus classroom, or at a public Internet access site via an integrated nation-wide broadband telecommunications infrastructure.

Lifelong learning will be an accepted fact of life. Even if job and family commitments prevent Canadians from attending a campus, they will find online the learning opportunities they need as a basis for personal fulfilment, not to mention keeping their job, finding a new one, seeking a promotion or creating their own business. As a result, Canada's flexible, knowledgeable and highly skilled work force will be the envy of the world.

E-learning will allow learners young and old to choose among an unprecedented range of courses and programs from different colleges and universities to find the precise mix that meets their needs. And, even though they have taken courses from many different institutions, improved arrangements for credit transfer will enable them to receive appropriate credits toward a degree, certificate or diploma.

A fully bilingual online learning infrastructure will ensure that French- and English-speaking minorities anywhere in the country have access to a range of learning opportunities comparable to that of the majority.

New alliances and forms of cooperation among Canada's colleges and universities and the private sector will have created new synergies and critical mass within Canadian post-secondary education. The result will be a system that not only responds to the social and economic needs of Canadians but also wins a sizable portion of the exploding market for learning around the world.

A Strategic Framework

We believe fulfilment of this vision demands rapid implementation of a pan-Canadian action plan by provincial/territorial and federal governments, Canadian post-secondary institutions, their faculty members and learners across the country. This action plan is laid out in the next three chapters.

It is an ambitious plan — in keeping with the scale and significance of the challenges facing us as we build here in Canada the learning infrastructure for the next several decades of local, regional and national socio-economic development.

Implementation of this plan is a matter of utmost urgency. If we do nothing, our world leadership position in e-learning will quickly disappear, our own institutions will face stiff and perhaps damaging competition, and Canadians both as individuals and a society will find themselves trailing behind people in G-8 countries in the race for jobs and economic growth.

Yet this plan will only succeed if it engages the trust of both orders of governments, as well as learners, faculty members and institutions.

While taking a necessarily pan-Canadian perspective on many issues, we fully respect in our recommendations provincial and territorial jurisdiction over education. At the same time, many of our recommendations call for new forms of collaboration among institutions and provincial, territorial and federal governments — such as the intergovernmental cooperation that allowed SchoolNet to succeed. We hope that the trust and willingness to cooperate on creative solutions shown in our joint establishment by the CMEC Postsecondary Expectations Project and Industry Canada can be sustained and strengthened in the implementation of our action plan.

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In formulating this plan, we sought an appropriate balance between a number of fundamental principles. We have weighed the imperative of collaboration against the need for innovation, the necessity of flexibility against the requirement of accountability, the drive for excellence against the value of inclusiveness.

Themes of inclusiveness pervade this action plan — the need to support both colleges and universities, the importance of meeting the needs of both French- and English-language learners, the imperative of responding to regional differences, the importance of involving institutions, faculty, learners, support staff and others in the implementation of e-learning, and the necessity of ensuring both urban and rural learners benefit from online learning. Our action plan focusses on the need for more e-learning content (a provincial/territorial responsibility) and the telecommunications infrastructure required to deliver it (where the federal government has the lead), as well as the need for incentives, and every Canadian's entitlement to learning opportunities.

In this action plan, markets remain secondary to our overriding concern for ensuring that online learning is expanded in such a fashion as to extend lifelong learning to all Canadians and improve the quality of post-secondary education. We believe that **e-learning has the potential to improve access to lifelong learning and contribute to equality of opportunity without sacrificing quality**. This plan is about realizing that promise. It aims at expanding online learning in such a fashion as to:

- **Enhance the quality of the post-secondary learning experience through institutional strategies, expanding the amount of high-quality online learning materials and supporting learning research and learnware product development.** Initiatives for meeting this goal are described in Chapter 4.

- **Improve the accessibility and flexibility of post-secondary learning opportunities.** To improve accessibility and flexibility, Chapter 5 calls for measures to extend high-speed telecommunications infrastructures to both institutions and learners, wherever they are located. To make such access meaningful to learners, the chapter also calls for measures to ensure learners can take advantage of that infrastructure. As a means of improving flexibility, our plan also calls for action to enhance the portability of post-secondary education by encouraging greater recognition of credits across jurisdictional boundaries.
- **Create synergies and greater critical mass within post-secondary education in Canada.** Chapter 6 sets out a pan-Canadian approach to supporting learners, assisting institutions and faculty members, and marketing Canadian online learning materials domestically and around the world.

These three goals are interdependent: progress in realizing one will reinforce efforts to achieve the others. Conversely, none can be safely ignored without hampering efforts to fulfil the others.

The direct responsibility for delivering online learning will fall upon institutions. If they have not done so already, it will be critical for them at the outset to set up a multi-stage integrated strategic planning process to ensure that they make the right decisions about the sizable investments required for a move into e-learning.

Recommendation

3.2 Universities and colleges should establish an integrated strategic planning process for online learning.

Appendix C provides more detail on what this process should entail.

However, as the next three chapters show, excellent strategic planning and resource re-allocation by institutions alone will not be sufficient to meet the challenges and seize the opportunities of online learning. Provincial, territorial and federal governments also have a crucial role to play, as do faculty members and learners themselves.

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4. Enhancing Quality

The first goal of our action plan is to ensure that online learning is used to enhance the quality of the post-secondary learning experience in Canada. We believe that quality deserves this emphasis because neither learners nor their families nor faculty members nor our institutions nor employers nor Canadian governments should be satisfied with second-rate learning experiences.

The potential for a high-quality learning experience from e-learning is clear. Many learners, particularly those with extensive experience of the Internet, should enjoy the active, collaborative and self-directed approaches to learning enabled by the online experience. Online learning should complement and enrich traditional on-campus instruction. In addition to increasing the excitement of knowledge exploration by offering a vista on the world, online learning should allow learners to develop specific applied skills now in great demand.

The reality is, however, that this promise will not be realized without initiatives to remove significant obstacles to the flourishing of e-learning. Quite simply, there are far from enough online courses and programs, and their development and delivery will involve a significant structural adjustment by most institutions and a commitment of resources beyond the capacity of any institution. Research and development will also be needed to discover the best ways of exploiting the potential of this new medium. As well, copyright and intellectual property issues arising from this new digital environment may inhibit the development of online learning.

In light of this fact, we have suggested a number of strategies that institutions should adopt to ensure the creation and delivery of high-quality online modules, courses and programs. Our action plan also calls on governments to play a key role in expanding high-quality online learning materials and skills and in supporting learning research and learnware product development. Finally, it will be necessary for both institutions and the federal government to address the intellectual property and copyright issues raised by online learning.

Institutional Strategies

Though Canadian institutions have been pioneers in developing content for distance education and e-learning, they have only scratched the surface of what will be required in the next few years. There are a number of strategies that might make this task easier. The first is to take a very systematic approach to the development of online courses and programs. The second is to take measures that will encourage faculty members to become involved in online learning. Other related measures that institutions should take are discussed in Appendix C.

Online Course and Program Development

While e-learning in its initial phases within an institution depends largely on the work of individual instructors acting alone or with a few others, a serious commitment involves a more systematic approach to online course and program development. Otherwise, it is difficult to mobilize the energies of the institution behind e-learning and meet the challenge of harnessing this new medium.

Recommendation

4.1 To provide learners with a high-quality online learning experience that meets their needs, post-secondary institutions should commit themselves to systematically supporting the development of online modules, courses and programs.

The steps that could be taken are presented in detail in Appendix C, but some are fairly obvious. Institutions should set standards with respect to the quality of online courses and programs. They should provide significant support to those engaged in multimedia design and the development of online curricula. In an environment where institutions may join consortia and learners may be taking courses from several colleges and universities at once, institutions may have to devote considerable resources to ensuring, through meta tagging and a range of other approaches, that online courses, programs and learning objects can be shared with other institutions and that credits can be transferred between institutions. In an environment characterized by students using different platforms and by a range of consortia and strategic partnerships, it can be important for institutions to make sure their online courses are technology independent. Online courses and programs can also be designed to scale and to be responsive to learners' career and other needs and demands in a rapidly changing environment.

Supporting Faculty Members

In the Statement on Technology Enhanced Learning released this year, the AUCC emphasized, "Technology is not a substitute for a strong relationship between teacher and learner. Rather, it can and should be used to nourish, transform and enrich these relationships and promote a more active and student-centred learning."[27] In other words, though roles may change, faculty members remain as crucial to the quality of the e-learning experience as they have been in a traditional classroom or laboratory setting.

Yet there remain many obstacles to greater use of the new learning tools by faculty members. If online learning is to succeed, institutions must take a systematic approach to overcoming these obstacles and making it easier for faculty members to become involved in e-learning.

Recommendation

4.2 To ensure greater use of online learning by faculty members, post-secondary institutions should systematically support faculty involvement in online learning.

The forms such support could take appear in Appendix C to this report. Obvious steps include encouragement and support for early adopters of e-learning among the faculty and ensuring all faculty members have access to the necessary hardware, software and communications links. Support on technical and instructional design issues will also be helpful. There is also a real need for measures to help faculty members acquire the skills needed to use this new medium effectively. As well, rewards and incentives for faculty members will likely require re-alignment to take these teaching innovations into account.

It is very important to keep in mind that, for faculty members, developing online modules, courses and programs, in addition to providing the labour-intensive coaching most online learners require, can be very time-consuming. Faculty members cannot be expected to sustain a commitment to online learning while continuing to carry their traditional teaching, research and engagement responsibilities. If e-learning is to flourish, it will be important for institutions to release faculty members from some of their duties so that they will have the time to devote to online learning. However, it is

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[27] Association of Universities and Colleges of Canada, *Draft AUCC Statement on Technology Enhanced Learning*, p. 2.

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Yet there remain many obstacles to greater use of the new learning tools by faculty members. If online learning is to succeed, institutions must take a systematic approach to overcoming these obstacles and making it easier for faculty members to become involved in e-learning.

Recommendation

4.2 To ensure greater use of online learning by faculty members, post-secondary institutions should systematically support faculty involvement in online learning.

The forms such support could take appear in Appendix C to this report. Obvious steps include encouragement and support for early adopters of e-learning among the faculty and ensuring all faculty members have access to the necessary hardware, software and communications links. Support on technical and instructional design issues will also be helpful. There is also a real need for measures to help faculty members acquire the skills needed to use this new medium effectively. As well, rewards and incentives for faculty members will likely require re-alignment to take these teaching innovations into account.

It is very important to keep in mind that, for faculty members, developing online modules, courses and programs, in addition to providing the labour-intensive coaching most online learners require, can be very time-consuming. Faculty members cannot be expected to sustain a commitment to online learning while continuing to carry their traditional teaching, research and engagement responsibilities. If e-learning is to flourish, it will be important for institutions to release faculty members from some of their duties so that they will have the time to devote to online learning. However, it is

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[27] Association of Universities and Colleges of Canada, *Draft AUCC Statement on Technology Enhanced Learning*, p. 2.

important to keep in mind that providing such release time will commit institutions to very sizable expenditures they can ill afford — especially at a time of swelling enrolment when faculty members from the baby boom are reaching retirement age.

The development of online courses and programs can be quite costly because it is not enough simply to put a faculty member's course notes online. In the present competitive international environment, few learners will accept such a paper-based, non-interactive approach that fails so completely to take advantage of this new highly interactive and visual medium for learning. Creating online courses involves, first of all, a serious commitment to understanding the very different features of this medium and the ways it can be used most advantageously to impart learning. Then it is necessary to undertake a development effort involving a sweeping deconstruction of the content for traditional courses and its imaginative reconstruction to exploit the unique features of the online medium.

Expanding Online Learning Materials and Skills

It is a central precept of this report that the fostering of a lifelong learning culture will be an essential foundation for a civil and prosperous society in 21st-century Canada. Critical to achieving this goal will be use of the new learning tools to ensure all Canadians can take advantage of lifelong learning opportunities. Yet if online learning is to contribute to the achievement of this objective, then there must be a significantly greater quantity of high-quality e-learning materials than exists at present. Those materials must be provided by Canadian institutions — if the provision of lifelong learning is to be responsive to the interests, concerns and priorities of Canadian communities and if these institutions are to continue to play their important role in local, regional and national socio-economic development.

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Estimates vary enormously as to the cost of developing a single online course. The average cost of a course developed under SchoolNet's pilot NoteMakers program was $47 000. An initiative under the Canada Youth Employment Strategy, the program combined the Internet skills of young Canadians with the knowledge and experience of post-secondary educators to produce high-quality online academic materials. By way of contrast, Moe and Blodget in their study for Merrill Lynch have estimated that the cost of an "effective, engaging online course" could run as high as US$1 million.[28]

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[28] Moe and Blodget, *The Knowledge Web*, p. 185.

Many observers believe human resources are the most significant cost in online course development. As well, the more streaming video, copyrighted material and elaborate simulations are used, the higher the costs will be. At the same time, new course-authoring systems can reduce the cost of developing a course. Despite such advances, there can be little doubt that intensifying global competition will drive costs upward as institutions begin to compete by raising the ante with respect to the production values of their course material.

Such an effort demands a serious commitment of faculty members' time — time that will be unavailable for other activities. After more than a decade of restraint, in an era when enrolments are rising and the large number of faculty members from the baby boom are starting to reach the age of retirement, institutions cannot afford the luxury of giving large numbers of faculty members release time to develop online learning materials or run online courses. Nor do institutions have the resources to underwrite the development of the large number of online learning materials required to support lifelong learning in a meaningful way or satisfy the expectations of the present generation of learners. In fact, the move to e-learning will involve a significant and expensive structural adjustment by institutions.

Thomson and rival to buy U.S. publishing giant

In what is being called one of the most important publishing deals of the year, Thomson Corp. and rival Reed Elsevier Plc. have struck a multi-billion [dollar] deal Friday to buy and split up U.S. Harcourt General Inc.

Under the agreement, Reed Elsevier, based in Britain and the Netherlands, will pay $59 (U.S.) a share for Harcourt for a total of $5.6-billion, including the assumption of $1.2-billion in debt.

The two will then split up Harcourt's four main divisions, with Toronto-based Thomson taking Harcourt's textbook unit and other assets, including the company's corporate and professional services group, for $2.06-billion (U.S.) in cash....

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"This acquisition is consistent with Thomson's strategy to be a major player in the global higher education and corporate and professional training markets," Thomson president and chief executive Richard Harrington said in a statement.

The new businesses, he said, will expand Thomson's higher education portfolio and enhance its electronic education business on a global level.

Terry Weber
in *The Globe and Mail*
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Given this resource situation, the only alternative is for Canadian governments to work together in the provision of substantial new funding for the stimulation of e-learning and the renewal of existing learning materials at both the course and program levels. The matter is urgent enough that provincial/territorial and federal governments should work together to find a fair and equitable way of providing substantial funding to make online learning a vibrant reality in the local, regional and national communities of this country.

Recommendation

4.3 Because Canadian institutions of higher learning face enormous challenges in producing and maintaining an adequate volume of high-quality online learning, governments need to work together to provide substantial funding in such a way as to stimulate new online education and renew existing material both at the course and program levels.

The resulting expansion of online learning will significantly increase demand for people with the skills to implement, manage and evolve e-learning environments. Already, such people are in short supply and this shortage will only intensify unless there is a significant increase in the number and capacity of the educational programs to impart these skills. There is, in short, a real need for serious investments in these programs, not just by governments, but also by the private sector and institutions.

Recommendation

4.4 The private sector, post-secondary institutions and governments should invest in the establishment and expansion of educational programs to teach and foster the required e-learning skills in the Canadian labour force.

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Learning Research and Learnware Product Development

Given the critical importance of learning to the competitiveness of countries and the success of both individuals and companies, research on learning and learnware product development should be a top priority for nations around the world. In the case of online learning, a new learning medium with enormous potential, the case for a serious commitment to research and development is even more compelling. The country that first learns how to exploit fully the potential of this new medium, and transforms this understanding into products, will have a significant competitive advantage over other nations in its capacity to develop human capital. Conversely, the post-secondary institutions of countries that are runners-up or also-rans in this research and development effort may well face a severe competitive challenge that will erode their capacity to respond to local, regional and national needs for a skilled and knowledgeable labour force.

We must ensure that Canada, its post-secondary institutions and its learnware industry can meet this challenge.

A Requirement for Substantial New Funding

According to the Organisation for Economic Co-operation and Development, Canada spends more per capita on education than almost any country in the world. In 1998–1999, Canadians put an estimated $60.5 billion into education[29] — second only to health. Research and development on learning are critical to ensuring that these large sums are spent wisely. Such an effort is also crucial to ensuring that educators at the post-secondary levels are in a position to take advantage of this new medium of e-learning and make sure it provides quality learning opportunities to Canadians.

If the goal is world leadership in learning as a key condition for competitive success, then the Canadian commitment to learning research and development does not measure up. Though faculties of education have taken a major responsibility for pedagogical research, there is a serious need now for research at the level of the individual discipline on how to teach it in the online environment. Provincial/territorial governments also have not moved aggressively to support research and development through either faculties or boards of education. In fact, the only large-scale investments in learning research and development have been made via research grants from the Social Sciences and Humanities Research Council of Canada (SSHRC) and the TeleLearning NCEs.

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[29] Council of Ministers of Education, Canada, and Statistics Canada, *Education Indicators in Canada: Report of the Pan-Canadian Education Indicators Program 1999*, p. 54.

The corporate commitment of Nortel Networks to research and development to make most effective use of ongoing expenditures provides an approximate indication of what would be required to attain world leadership — some 13 percent of revenues.[30] If this benchmark were applied to the federal contribution of some $4.7 billion to post-secondary education in 2000–2001, then institutions of higher learning would have some $580 million a year to spend on learning research and development. Though it is almost impossible to come up with precise numbers on how much is actually spent across the country on learning research and development at the post-secondary level, it is clear even from the meagre data available that the figure comes nowhere near that amount.

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The research and development required are wide ranging and comprise at least two broad categories of activity.

First, there is a serious need for more **theoretical and applied research on learning**, both traditional and online. Here are a few of the important areas that demand attention.

- The advent of a new medium of learning inevitably highlights the features of more traditional media, creating an opportunity to explore in greater depth the strengths and weaknesses of both.
- Theoretical and applied research can focus on how both learning and teaching at all levels can be remodelled to take advantage of both kinds of media. In this way, such research can provide a basis for, and practical ways of, improving the effectiveness of both, as well as defining what should be the most appropriate roles for each medium in relation to different kinds of learners and content.
- Such research should also focus on how people learn, how different people learn differently, how people engage in learning and continue it throughout their lives, and how learning is most effectively imparted.
- Quite apart from the "online" nature of learning, broader efforts to explore and understand the process of learning throughout life will require serious reflection and investment.

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[30] Nortel Networks, *Annual Report 1999 : Changing Times New Beginnings*, p. 3.

- There is a real need for in-depth research focussing on the learning requirements of different disciplines in relation to all of these issues. For example, is there an effective way to provide online the kind of learning experience offered by a traditional chemical laboratory?

This research should be broadly multidisciplinary and issue-oriented as well as problem- and results-oriented. The initiation of a new research effort into how people learn and how learning can best be disseminated will require significant new research investments managed in non-traditional ways.

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Second, there is a need for a far greater commitment to the **development of learnware products** — the wide range of electronic learning tools required to make online learning effective and exciting to learners. Such tools include everything from course-authoring systems, course management systems, learning objects and modules, through various kinds of learning aids, digitized learning resources, multimedia learning environments, and so on. Given the ingenuity and commitment already in evidence within Canada's learnware industry and post-secondary institutions, the payoff from an investment in learnware product development will likely be very sizable.

Neither Canada's young learnware industry nor its post-secondary institutions can sustain by themselves such a research and development effort. After a decade of restraint, institutions cannot undertake this effort at the expense of their other vital duties.

Additional investment will be needed from government. For such investment to be meaningful, it will have to be substantial and provided over the long term. Such funding should not come from a re-allocation of existing funds available for research and development in other areas, given that the level of research and development in Canada is well below that of most of its major industrialized trading partners. Put simply, there is a need for new funding in this area of high strategic priority for our entire economy and society.

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Recommendation

4.5 To meet the challenge of the new learning environment and improve the effectiveness of traditional and online learning, substantial, new, long-term funding should be provided for:

- **a. applied and theoretical research into learning, both traditional and online; and**
- **b. learnware product development.**

An important question is what body or bodies should dispense such funding.

One deficiency of the present regime for learning research and learnware product development is that efforts are scattered and lack a pan-Canadian focus. Multimedia companies and firms providing learning products and services carry out some research and considerable product development. Post-secondary institutions themselves, particularly their faculties of education, also perform research and development in the learning area. Research and development are also conducted under the aegis of a range of provincial agencies that do not always work closely with each other. The SSHRC, a federal granting council, is currently the major disburser of research grants on learning, though most of its grants focus on primary and secondary education or pedagogical issues, and are aimed at faculties of education.

What pan-Canadian focus emerges in online learning research and development under the present arrangements is a result of CANARIE's Learning Program, the SchoolNet Multimedia Learnware and Public Access Applications Program, and the TeleLearning NCEs, which stimulates and tracks advances in telelearning research in collaboration with university and industry partners throughout the world. Such modestly funded efforts, no matter how well managed, do not have the mandate or resources to impart a sufficiently broad focus — that is, both online and traditional — to learning research and development across the country. As well, none of these agencies, as currently funded, is able to bring to bear the kind of multidisciplinary perspective on how to teach particular disciplines in the new learning environment.

We submit that the disbursers of such funding should be able to bring to bear a pan-Canadian, multidisciplinary perspective to build critical mass and take advantage of synergies across the country. As well, because applied and theoretical research into learning and learnware product development are profoundly different activities, different funding mechanisms should be used in each area.

Mechanisms to Support Learning Research

It will be critical for the theoretical and applied research on traditional and e-learning to address the specific needs of different disciplines at all levels of the educational system. In other words, the research must be results-oriented and managed in a non-traditional way. Every effort should be made to ensure that funded research leads to the timely development of online learning objects, modules, courses and programs.

For this reason, the research should be conducted within post-secondary institutions where the capacity to conduct such research already exists and where much of it will find its initial application. More specifically, such funding should only be provided to publicly funded universities and colleges, their faculty and consortia of such institutions.

Recommendation

4.6 To ensure that learning research is relevant to the instructional responsibilities of post-secondary institutions, only publicly funded Canadian institutions, their faculty and consortia of such institutions should be eligible for funding support.

Given the powerful traditions of academic freedom and institutional autonomy in the post-secondary community, the investment mechanism used should not be government itself, but some body independent of, or at arm's length from, government. The organization should be a body that is familiar to the academic community and makes use of academic juries. This approach would have the welcome effect of placing teaching and research, from the academic's viewpoint, on an equal footing in terms of availability of external funds, peer recognition, freedom of expression and opportunities for creativity. One result would be a renewed commitment to teaching.

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In Canada, only the federal granting councils are capable of fulfilling such a role. However, they tend naturally to be focussed on supporting and stimulating research in their mandated areas, and there is a definite risk that in such an environment e-learning research might get lost in the shuffle. The mandates of neither the Natural Sciences and Engineering Research Council of Canada (NSERC) nor the Canadian Institutes of Health Research (CIHR) address the pedagogical issues associated with the learning research agenda described here. The mandate of the SSHRC, though it does address learning research and focus upon pedagogical issues, does not really address the technological issues associated with online learning. Though we applaud the announcement of a special allocation of $100 million over five years to SSHRC for research on the knowledge economy — including management skills, educational requirements and lifelong learning — we are concerned that such policy research may fail to address the learning research agenda we are recommending. As well, the mandates of the councils are such that currently most of their funding goes to universities rather than colleges. It would seem that the existing granting councils do not constitute an appropriate home for the research into traditional and online learning that we have in mind.

One possibility, of course, would be to provide new funding for all three councils to underwrite their support for the wide range of topics associated with the research agenda we are proposing. The councils could be mandated to create a tri-council steering committee to coordinate this multidisciplinary research agenda. While this approach has the virtue of not involving the creation of a new body, none of the councils has much experience with the kinds of results-oriented learning research that would provide the basis for developing new online courses and programs.

For this reason, the ideal solution would be to establish a fourth granting council with a mandate focussed on a broad, results-oriented multidisciplinary agenda of research into traditional and online learning to be carried out within both colleges and universities. Its very existence would be a powerful acknowledgment that learning is now critical to Canada's success in a global knowledge-based society and e-learning will be key to bringing learning to Canadians throughout their lives. We recognize, however, that it is no easy task to create a new body or institution.

Recommendation

4.7 To address the nation's need for applied and theoretical research in the area of learning (both traditional and online) at every level and in every discipline, the federal government should:

- a. provide additional resources to the existing granting councils (SSHRC, NSERC and CIHR) to facilitate this research, contingent on the creation of a central, tri-council coordination committee to oversee this research; or
- b. create a fourth granting council or a separate program to facilitate this research at arm's length from government.

Under either of these options, it will be important to ensure that the council or councils consult in an appropriate fashion with the CMEC, the ACCC and the AUCC.

This new body should play a complementary role vis-à-vis other provincial/territorial and federal initiatives to encourage learning research. For example, the funding body should gather information on precisely what initiatives have been undertaken in this area by all orders of government. It should investigate learning research across the country to determine where further investment is needed. Finally, the funding body should help coordinate efforts by Canadian leaders in the field and ensure research results are made widely available to institutions and to the Pan-Canadian Online Learning Service (described in Chapter 6). In these ways, the funding body can help prevent duplication of effort, create critical mass and encourage institutions to take advantage of pan-Canadian synergies in learning research.

Recommendation

4.8 To ensure pan-Canadian synergies, prevent duplicated effort and generate critical mass, the body funding learning research should:

- a. gather information on initiatives in learning research;
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Mechanisms for Supporting Learnware Product Development

For online learners to have a high-quality learning experience, there must be a profusion of software and electronic learning and authoring tools, resources and environments available to support both the learners themselves, and the faculty members and others who develop and deliver online courses. Most of these learnware products are developed by the private sector, though some emerge on university and college campuses.

The organization chosen for funding the development of these learnware products should be fairly independent of any particular government, aware of the play of market forces in this area and comfortable with the boundaries between the public and private sectors in education.

One option for funding learnware product development would be CANARIE, a private, not-for-profit corporation created and supported by the federal government. CANARIE has been successful through its Learning Program in bringing together institutions and the private sector in online learning projects of considerable strategic importance. As well, CANARIE administers for Industry Canada the SchoolNet Multimedia Learnware and Public Access Applications Program that provides financing, in conjunction with private sector partners, for the production of high-quality products for learning and public access on the Information Highway.

A second option for funding learnware product development is the CMEC. A third would be Industry Canada.

Whichever organization serves as the funding mechanism, it will have to make a special effort to create pan-Canadian synergies, prevent duplicated effort and generate critical mass in learnware product development. As was the case with the research funding body, the organization will have to gather information on what initiatives in learnware product development are now under way, assess existing product development to determine areas for future investment, and coordinate efforts by Canadian leaders and others in the field.

Recommendation

4.9 To create pan-Canadian synergies, prevent duplicated effort and generate critical mass, the organization funding learnware product development should:

- **a. gather information on initiatives in learnware product development;**
- **b. investigate existing learnware product development to determine where further investment in research is needed; and**
- **c. coordinate efforts by Canadian leaders and others in the field.**

It will also be very important for this organization to work closely with the research funding body and the Pan-Canadian Online Learning Service described in Chapter 6.

Evaluating Impacts and Ensuring Feedback

It will be necessary to evaluate the effectiveness of this research and development effort and provide feedback both to institutions and funding bodies as a basis for future improvements. Institutions and the research and development funding bodies should collaborate on creating measurement tools and metrics for assessing the effectiveness of learning research and learnware product development. For reasons of accountability, provincial/territorial and federal governments may also wish to be involved in developing these evaluation instruments.

Recommendation

4.10 Measurement tools and metrics for assessing the effectiveness of learning research and learnware product development should be developed.

One important measure of the success of these research and development initiatives will be the amount of economic and industrial activity surrounding learnware products. At present, there is no way to track this activity. One solution would be for Statistics Canada to establish a North American Industry Classification Code for the learnware industry so that data could be gathered on the industry in Statistics Canada surveys. In developing such a code, Statistics Canada should work closely with the CMEC, Industry Canada, provincial and territorial governments, CANARIE and the private sector.

Recommendation

4.9 **To create pan-Canadian synergies, prevent duplicated effort and generate critical mass, the organization funding learnware product development should:**

a. **gather information on initiatives in learnware product development;**
b. **investigate existing learnware product development to determine where further investment in research is needed; and**
c. **coordinate efforts by Canadian leaders and others in the field.**

It will also be very important for this organization to work closely with the research funding body and the Pan-Canadian Online Learning Service described in Chapter 6.

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Recommendation

4.11 The North American Industry Classification Code for the learnware industry should be established by Statistics Canada in collaboration with other stakeholders.

In the same vein, it would also be useful to examine the long-term effects of supporting learnware product development. It would not be difficult to track financial investment in the area, its successes and failures, and the use of learnware technology and products.

Recommendation

4.12 The long-term economic effects of the learnware industry should be analysed by tracking:

a. financial investment in the industry;
b. its successes and failures; and
c. the usage of learnware technologies and products.

This analysis could be conducted by the CMEC or the education or industry departments of provincial and territorial governments. Other possibilities include Industry Canada or Human Resources Development Canada, both of which have responsibilities relating to learning technologies. Another option would be the Pan-Canadian Online Learning Service (described in Chapter 6), which would be very well positioned to collect data in all these areas.

Copyright and Intellectual Property

Neither copyright legislation nor the intellectual property policies of many of our institutions have kept pace with developments in the digital world or the emergence of e-learning. Changes will be needed to ensure that learners can seize the opportunities created by the new learning environment.

The issues surrounding these changes, however, are complex and difficult. With only five months to cover a very extensive terrain, the Advisory Committee did not have time to delve into the intricacies of copyright and intellectual property in a digital era.

Copyright Legislation

In 2001 the Government of Canada is expected to revise its copyright legislation to reflect the realities of the digital environment.

The AUCC has taken a clear position on some of the key learning-related issues that should be addressed in this copyright revision. For example, the amendments should make it clear that fair dealing and other statutory exceptions for educational and library uses apply in the digital environment. To facilitate online learning, the scope of the fair dealing exception should be expanded and other new exceptions should be included. An efficient copyright clearance mechanism should be established, and the federal government should ensure the widest possible access to its own digital works. The Advisory Committee endorses this AUCC position.

Recommendation

4.13 The Advisory Committee urges the federal government to act on the public policy priority of the Association of Universities and Colleges of Canada to the effect that "Federal copyright laws must:

a. clarify that fair dealing and other statutory exceptions for educational and library uses apply in the digital environment;
b. expand the scope of the fair dealing exception and include new exceptions to facilitate technology-enhanced learning;
c. establish an efficient copyright clearance mechanism for works created by third parties in any format, especially multimedia works and digital works on the Internet; and
d. ensure the widest possible access to digital government works."[31]

Intellectual Property Policies

Because online courses have at least the potential to reach large numbers of students and thus become important sources of revenue for institutions, the issue of who owns the material in such courses can become quite important. Should they belong to the institution that likely made a major investment to develop the course? What rights should belong to the individual academic who developed the course? What about the faculty, discipline or department to which the academic belonged? What about the technical and instructional design people who assisted in the creation of the course? Do the rules for third-party copyrighted materials change in the digital world?

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[31] Association of Universities and Colleges of Canada, *Draft AUCC Statement*, p. 4.

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These questions are difficult and far reaching, and can affect most of the stakeholders in an institution. In fact, institutions here in Canada and in other countries have been involved in disputes with their own academics over intellectual property rights.

We have observed that lack of a clear institutional policy on intellectual property, as well as ambiguities in an existing policy, can lead to disputes that can frustrate the move to e-learning and prevent the development of high-quality courses and programs. Such policies should apply consistently across the institution. They should also be fair, taking into account the respective positions of institutions, academics, departments, disciplines and instructional design personnel. Moreover, a clear understanding of who owns courses will be necessary for consortia on shared courseware to function effectively.

Recommendation

4.14 Post-secondary institutions should have in place intellectual property policies for online learning, and these should be characterized by clarity, consistency and fairness.

Summary

Our action plan sets out a variety of institutional strategies to ensure a high-quality online learning experience for Canadians. Yet the challenge is so great, involving a significant structural adjustment by our institutions, that we believe a large-scale move into high-quality e-learning will only occur if there is a substantial infusion of new funding to stimulate an expansion in high-quality online learning materials and substantially more learning research and learnware product development. However, neither this investment nor the institutional strategies described here will necessarily deliver a high-quality e-learning experience to Canadians unless infrastructure and support systems are in place to provide access on an affordable basis of online course and program offerings. The next chapter addresses this question.

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5. Improving Accessibility and Flexibility

Online learning can greatly expand learners' access to post-secondary education and a wide range of information. As well, this new learning environment promises to be extremely flexible, allowing learners to choose where they learn (at home, at work or on campus), when they learn (24 hours a day, 365 days a year), what they learn (from possibly a number of different institutions at the same time) and the pace at which they learn. This flexibility is especially critical to adult learners with job and family commitments, as well as members of English- or French-language minorities who can use e-learning to increase significantly the range of choice, in their own language, to which they have access.

Yet a number of significant obstacles exist to ensuring such flexibility and accessibility in Canada, and our plan calls for measures to overcome them. It recommends steps to ensure that all Canadian institutions and learners are connected by the kind of high-speed infrastructure that allows for a high-quality learning experience. We call for measures to help ensure that online learning is provided on an affordable basis. Our action plan suggests initiatives by institutions to support learners in this online environment and enable them to have a meaningful e-learning experience. Finally, we set out a process to reduce existing barriers to the recognition of course credits across institutional and jurisdictional boundaries.

Making Connections

As Chapter 2 indicated, Canada has made enormous progress in creating an Internet infrastructure capable of reaching post-secondary institutions and learners. This country leads the world in terms of providing broadband access by its citizens to the Internet, and we are among the world leaders in terms of our levels of Internet access. Many Canadian universities are now connected to CA*net 3, the high-speed, nation-wide Internet backbone operated by CANARIE. Canada was the first country in the world to connect all our schools and libraries to the Internet. Through the Community Access Program, jointly funded by federal and provincial/territorial governments, 10 000 public access sites where people can access the Internet will have been established across the country in rural, remote and urban communities by March 31, 2001.

Yet much remains to be done. Many Canadian institutions have only rudimentary networks in place to serve learners on campus and there remain many urban institutions and most rural ones that still need to be connected to CA*net 3. Though Canada may lead the world in the proportion of people with high-speed broadband access to the Internet, the simple fact is that by the end of 2000 only about 17 percent of Canadians expect to have such access.[32]

As an advisory committee, we applaud the announcement in October 2000 by the federal industry minister that a National Broadband Task Force will be established to advise the Government of Canada on how best to make high-speed broadband Internet services available to businesses and residents by 2004. We expect that such services will be available by then — at least to most businesses and public access sites. We believe that these same high-speed connections must be available to all on-campus learners much earlier — by 2002.

Creating a Pan-Canadian High-Speed Learning Network

High-speed broadband connections are critical to having a minimally satisfactory learning experience with online learning. If Canada is to build the lifelong learning culture so critical to competitiveness in the global knowledge-based economy, then all Canadian learning institutions and learners must have access to a high-speed infrastructure. The highest priority must be attached by governments and the private sector to this goal.

How high-speed should this broadband infrastructure be? Given the rapid pace of technological change, it would be imprudent to come up with a hard figure. We will thus not define high-speed in quantitative terms that will quickly become obsolete, but instead argue that Canadians deserve the kind of high-speed connections that the "state-of-the-art" can deliver.

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Further, CANARIE's high-speed Internet backbone, CA*net 3, already has points of access in every Canadian province and many urban areas, though only 57 universities and no colleges are linked to it. We believe that CA*net 3 provides the foundation for linking every publicly funded post-secondary institution in the country to a fully integrated high-speed learning network by the end of 2001. This network should be continually upgraded thereafter.

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32. Partridge and Chu, "Poor won't fuel Net growth: study."

As a not-for-profit corporation with a mission to accelerate Canada's advanced Internet development and use, CANARIE's activity should complement that of provincially funded research networks and firms providing telecommunications services in bringing high-speed connections to post-secondary campuses. CANARIE, provincial and territorial governments, provincial research networks, and firms providing telecommunications services should collaborate closely on shared solutions that connect CA*net 3 to every university and college campus in the country by 2001.

Providing network connections should ideally involve close collaboration in a locality among post-secondary institutions, private businesses and other public sector institutions under the responsibility of federal, provincial/territorial and municipal governments. For example, a college or university could form a partnership with a municipal government, local health facilities, school boards, some local firms and the district offices of provincial/territorial and federal departments to share the cost of bringing in high-speed links. Together, the partners could approach providers of telecommunications services or private network services for engineering studies and bids for providing the necessary high-speed links. The more partners involved, the less the costs for each one.

In our view, provincial/territorial, federal and municipal governments should encourage their departments, agencies and private sector partners to enter into such collaborative arrangements with universities and colleges to share the cost of high-speed links. In this way, both institutions and learners will soon be able to have broadband connections at a lower cost.

The *RISQ* network in Quebec provides one model for such collaboration in the development of a provincial high-speed infrastructure to connect all institutions. The *RISQ* corporation is fully owned by the institutions, as is the fibre-optics network that was developed in partnership with telephone companies.

Increasingly, such local consortia of public and private sector partners are approaching private contractors to build fibre-optic networks all across Canada. The availability of low-cost fibre-optic cable is driving this revolution. CANARIE President and Chief Executive Officer Andrew Bjerring and Bill St. Arnaud, Senior Director of Advanced Networks, have compiled a brief list of some of these initiatives.

- More than 26 Quebec school boards representing more than 1000 schools are planning to deploy or have already deployed dark-fibre networks interconnecting their schools.
- Edmonton-based EPCOR (formerly Edmonton's electrical utility) is leasing its dark-fibre cable plant to the Northern Alberta Institute of Technology (NAIT) to link four campuses in Edmonton.
- The Ottawa-Carleton Research Institute network (OCRInet) has issued a research funding initiative for the building of an Ottawa-area dark-fibre condominium to connect businesses, schools, universities and community colleges.[33]

Many of these initiatives result from provincial and territorial programs that have been supportive of high-speed connections to post-secondary institutions, other public sector institutions and private businesses in localities across the country. Quebec's support for *RISQ* and Ontario's backing of ONet and its Telecommunications Access Partnership Program represent important initiatives. Also noteworthy is British Columbia's commitment of $123 million over six years to its Provincial Learning Network, which will serve 1700 schools, 22 post-secondary institutions and 20 community skills centres.[34] The Alberta government awarded a contract in 2000 to a consortium of companies to build a condominium fibre network throughout the province. This will open up telecom competition to over 420 communities in Alberta and provide for very low cost 10 and 100 Mbps Internet service to all schools, hospitals and other public sector institutions.[35]

The federal government's Connecting Canadians initiative, which is carried forward in partnership with provinces, territories and the private sector, also provides a foundation on which to build. One of its components, SchoolNet, has already made Canada a world leader in educational connectedness, while the Community Access Program will meets its target of 10 000 public access sites across the country in a matter of months. Governments and the private sector should sustain and build on these programs to extend a high-speed infrastructure to all learners through public access sites by 2003. This infrastructure should be maintained at a "state-of-the-art" level into the future.

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[33] Andrew K. Bjerring and Bill St. Arnaud, *The Coming Revolution in Dark Fibre Networks*, p. 2.

[34] Ministry of Education, Government of British Columbia, "Provincial Learning Network Provides Affordable Internet Access for B.C. Students."

[35] Government of Alberta, http://www.innovation.gov.ab.ca/supernet

Recommendation

5.1 To ensure access across the country to high-quality learning opportunities and lay the basis for Canada's international competitiveness in a knowledge-based society, provincial/territorial and federal governments should work together and with the private sector to establish — building on the CANARIE and SchoolNet foundations — a fully integrated, high-bandwidth learning network that will:

   a. link all publicly funded post-secondary institutions by 2001;
   b. provide anywhere, anytime high-bandwidth access to on-campus learners by 2002;
   c. ensure high-bandwidth connections are available to all K-12 classrooms, libraries and public access sites throughout Canada by 2003; and
   d. be maintained at a "state-of-the-art" level into the future.

The Wired Campus

If institutions intend to offer significant online learning opportunities, they should set as a goal for themselves the construction of a robust network infrastructure with high-speed connectivity.

This infrastructure should be progressively enhanced and extended to meet both learners' educational needs and the needs of researchers for access to a high-speed connection. It should provide learners and faculty members with consistent, reliable high-speed network access both on and off campus. It should be available in all learning areas on campus and allow convenient and affordable access to computing. It should use open information technology standards so that it will be compatible with other systems and network infrastructures, as well as users' varied platforms. Its operation should be governed by well-supported and open information technology and information management system standards. It should employ standard software appropriate to users' requirements. Technical support should be available. Finally, it will be important to renew this infrastructure both in whole and in part as technology changes.

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- **a. progressively enhanced to meet the educational needs of learners and the access needs of researchers;**
- **b. consistently and reliably accessible from within the institution and from off campus via the Internet;**
- **c. ubiquitous, offering convenient and affordable access to computing;**
- **d. based on open information technology standards and standard software appropriate to the user base;**
- **e. characterized by effective support for users; and**
- **f. continually renewed as technology advances.**

We recognize that some institutions are closer to achieving this goal than others. The intent of our recommendation is to provide a rough benchmark against which institutions can measure their progress.

Ensuring Affordability

Though online learning has enormous potential to improve the accessibility of post-secondary education opportunities, the cost can be considerable. Its overall impact must not be to raise the cost of higher learning for learners.

The affordability of those learning opportunities will be a key factor in our competitiveness as local, regional and national communities in the 21st century, since affordability will determine in part our capacity to build a culture for lifelong learning and ensure post-secondary learning opportunities are available to all Canadians throughout their lives.

While participation rates in post-secondary education are on the rise for all socio-economic groups in Canada, the disparities between different socio-economic groups is growing. In 1986, for example, there was no difference in university enrolments between those with low and middle socio-economic status. By 1994, a gap of 7 percent had grown between these two groups.[36] As well, according to the

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1999 joint CMEC–Statistics Canada report on educational indicators, "Approximately 27 percent of people between the ages of 25 and 54 pursued some form of job-related adult education and training in 1997, down slightly from 29 percent in 1991."[37] This statistic bodes ill for Canada's future competitiveness because it was during this period that the impact of the knowledge-based economy became apparent, and a rise in participation rates might have been expected as people tried to upgrade their knowledge and skills.

Affordability is clearly not the only factor in declining participation in adult education and training and in the lower participation rates in post-secondary education by people with lower socio-economic status. But at a time when many families need two incomes to sustain themselves, affordability should not be discounted. Indeed, between 1987 and 1997, tuition fees for post-secondary education rose 95 percent while average family incomes only increased by 0.4 percent.[38] In the 21st century, no one should have to choose between having to sustain themselves and getting a post-secondary education or pursuing lifelong learning opportunities. Such forced choices injure not just the individuals involved but our society and economy as a whole.

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Helping Lifelong Learners Help Themselves

Just as people receive a tax incentive under the Registered Education Savings Plan and a Canadian Education Savings Grant to support their children's post-secondary education, adult Canadians in the labour force should receive a tax incentive to save for their future learning needs through a registered learning savings plan. Similarly, it should be possible for people to use their savings under the Registered Education Savings Plan to finance lifelong learning. Such an incentive would benefit not just individuals but the economy as a whole because the new knowledge and skills acquired through lifelong learning would enhance Canada's competitiveness at the local, regional and national levels. This kind of incentive to learning would in the long run also reduce unemployment with all its social costs and associated drain on the public purse.

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[37] Ibid., p. 52.
[38] Ibid., p. 69.

Recommendation

5.3 The Government of Canada should develop and implement a Registered Learning Savings Plan that would provide working Canadians with a tax incentive to save money to meet future learning needs.

For more than 30 years, the federal government has operated the Canada Student Loan Program to provide full-time students with loans. Its long survival is testimony to Canadians' belief that our entire economy and society benefit if young people can pursue their education ambitions.

In a knowledge-based society where the skill and educational requirements are constantly changing, the same argument applies just as forcefully to part-time learners wishing to upgrade their skills or knowledge to keep their present job or find a new one. This reality was recognized when the government established the Part-time Canada Student Loan Program. However, the program is restricted to students in considerable need and does not really meet the needs of the majority of lifelong learners who may have adequate incomes but may still need a loan to cover the increased requirements for learning opportunities in a knowledge-based society.

Recommendation

5.4 The Government of Canada should replace the Part-time Canada Student Loan Program with a broader and more flexible Canada Learner Loan Program to provide lifelong learners with loans to meet their learning needs in a knowledge-based society.

Defraying Learners' Information Technology Expenses

Learners, even when they are taking courses in a traditional classroom at the elementary or secondary level — let alone at a post-secondary institution — must increasingly have access to a computer with the appropriate software to write essays and other assignments. With the arrival of e-learning, these information technology requirements will become more onerous and will often include high-speed Internet access as well as possibly laptops and other appropriate learnware technologies and tools. For the growing numbers of adult learners with family and job commitments, this electronic gear and software may well constitute their main window of access to learning.

The promise of improved accessibility from online learning should not be frustrated by the growing information technology expenses faced by either young or adult learners. Government should take steps to defray the cost of these learning tools because they are increasingly an integral part of learning at all levels, especially at the post-secondary level. Government action is particularly imperative in the case of learners in financial need — whether these be young learners or adult students with family and job commitments.

Recommendation

5.5 Within the needs assessment process for the Canada Student Loan Program, the proposed Canada Learner Loan Program and provincial/territorial student loan programs, Canadian governments should recognize the legitimate cost of computing hardware, software, Internet services, laptops and other appropriate learnware technologies and tools.

Assisting Employees

The flat or declining participation rates of adults in post-secondary education are in part a reflection of the fact that many small and medium-sized enterprises (SMEs) lack the resources in a competitive environment to make online opportunities available to their employees. These enterprises are among the most important generators of jobs in the economy. Using e-learning to upgrade their employees' skills and knowledge can mean greater productivity and improved competitiveness, not to mention benefiting the employees themselves. The process of creating a more skilled and flexible work force through e-learning will also have the effect of increasing the domestic market for learnware and the online offerings of post-secondary institutions. For all these reasons, governments should provide incentives to private sector corporations that encourage e-learning for their employees.

Recommendation

5.6 To enhance productivity in Canada and develop a stronger learnware industry, governments should provide incentives to private sector corporations that encourage e-learning for their employees.

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The flat or declining participation rates of adults in post-secondary education are in part a reflection of the fact that many small and medium-sized enterprises (SMEs) lack the resources in a competitive environment to make online opportunities available to their employees. These enterprises are among the most important generators of jobs in the economy. Using e-learning to upgrade their employees' skills and knowledge can mean greater productivity and improved competitiveness, not to mention benefiting the employees themselves. The process of creating a more skilled and flexible work force through e-learning will also have the effect of increasing the domestic market for learnware and the online offerings of post-secondary institutions. For all these reasons, governments should provide incentives to private sector corporations that encourage e-learning for their employees.

Recommendation

5.6 To enhance productivity in Canada and develop a stronger learnware industry, governments should provide incentives to private sector corporations that encourage e-learning for their employees.

Supporting Learners

Achieving access to meaningful online learning experiences involves considerably more than providing a high-speed connection and ensuring the affordability of needed equipment and software. Measures should be taken to make sure that students are aware of e-learning opportunities and that these respond to students' expectations. For the learning experience to be meaningful, it will also be necessary to ensure it is not frustrated by technical obstacles, undernourished by a lack of guidance or learning resources, or out of step with learners' individual learning styles. It will be particularly important to ensure that the needs of learners with disabilities are met.

Most of the responsibility for supporting learners in these ways should fall on post-secondary institutions. Appendix C contains considerably more detail on what those supports should be.

Recommendation

5.7 **Post-secondary institutions should provide a full range of technical and other supports to learners to ensure that they can take full advantage of online learning opportunities.**

It would also be highly desirable for institutions to provide a full suite of educational services and alternate learning resources for learners with disabilities. Achieving such an objective may not be easy because, even now, not all hardware, software, systems, learning tools and online courses and programs are designed so that they meet the varied needs of people with disabilities. As a consequence, it can sometimes be a costly and time-consuming process to adapt this technology so that it does meet these needs. It is therefore crucial that all online learning materials and information technology used in learning be designed so that they can be used by people with disabilities.

Recommendation

5.8 Post-secondary institutions, the private sector and governments should ensure that all hardware, software, systems, online courses and learning tools used in online learning are designed so that they meet the varied needs of persons with disabilities.

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It will be very important, for example, to ensure that Web pages and online course materials are designed in a way that is consistent with the provisions of the Web Accessibility Initiative (WAI) Guidelines of the World Wide Web Consortium. Among the many sponsors of the WAI is the Government of Canada.

Achieving Portability

The vast majority of learners, young and old, when they take a course or program at a post-secondary institution, are not just seeking skills or knowledge but recognition in the form of a credit, degree or certificate that they have in fact learned those skills and acquired that knowledge. For many, access to a course is meaningless unless they also receive a worthwhile credit for taking that course. Unfortunately, present systems of accreditation emerged in a paper-based world and are not very well adapted to the e-learning environment.

As professors and administrators from TeleEducation New Brunswick and the Telelearning Policy Initiative of Simon Fraser University have pointed out, "Many traditional universities have residency requirements for degree completion. Does e-learning make these obsolete?"[39] Dr. Mark Lowes, a communications professor at the University of Ottawa, puts forward another example of how present approaches to accreditation can frustrate the online learner: "A student is enrolled in one post-secondary institution and enrols in an online course produced and delivered by another institution and successfully completes the requirements for the award of course credit. Can this student be awarded course credit at their 'home' institution? If the answer to this question is 'no,' then the speed at which new online approaches for post-secondary education are adopted is likely to be hampered, and pedagogical innovations are going to be driven instead by the private sector."[40] At the same time, there is growing concern among learners and educators about privately owned "digital diploma mills" offering inferior courses and valueless credits and diplomas to unsuspecting students.

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In Canada, provincial/territorial legislation bestows accreditation rights on institutions and specifies the roles of its internal bodies such as boards, senates, etc. Each institution then drafts and ratifies its own by-laws, which govern its academic and other practices, including accreditation.

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[39] Brian Lewis et al., *Technology-Mediated Learning: Current Initiatives and Implications for Higher Education*, p. 30.

[40] Mark Lowes, *Implications and Responses of Online Learning for Postsecondary Educational Institutions*, p. 34.

Professional associations also play a role in providing accreditation for their members. In addition, most provinces or territories produce transfer credit guides listing courses offered by domestic and foreign universities and colleges. Generally, only courses listed in the transfer credit guides are accepted as accredited courses. Taken together, these various accreditation arrangements help to preserve the quality of post-secondary education.

However, they can pose formidable barriers to the accreditation of online courses across institutional and provincial/territorial boundaries. According to Dr. Lowes, "What we have now for accreditation in the area of online TML (technology-mediated learning) is inadequate to non-existent. The reality of this state of affairs is that if you don't step in and lead the way, then private sector interests will be more than happy to do so. In fact, until accreditors get involved, some observers say, private enterprise should fill the information void and rate the quality of courses on their own."[41]

We do not agree that the private sector should fill this void, especially in a global environment where accreditors could be owned by providers of learning services and market forces can be unresponsive to local, regional and national interests. Our provincial and territorial governments and post-secondary institutions have safeguarded quality and allowed learners a limited portability for decades. Our institutions and provincial and territorial governments can and should work together to develop new credit transfer agreements applicable in each province and territory and across the entire country to facilitate both true portability for learners and the removal of barriers to online learning, while continuing the commitment to quality in accreditation decisions. Further, conclusion of such agreements is a matter of urgent priority. Without them, the advance of e-learning within Canadian public-sector institutions will be gravely handicapped.

Recommendation

5.9 To encourage institutions to arrange credit transfers and make learning truly portable across the country, negotiations on credit transfers should be conducted to reach:

- **a. agreements among the post-secondary institutions within each province/territory; and**
- **b. agreements among provincial and territorial governments at the pan-Canadian level.**

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Because the responsibility for most transfer credit guides rests with provincial/territorial governments, negotiations within each province and territory should likely be facilitated by the provincial or territorial minister responsible for post-secondary institutions. At the pan-Canadian level, the facilitation role in negotiations could be taken by the most important multi-governmental, pan-Canadian organization in the educational sphere — the CMEC — or by national associations such as the AUCC and the ACCC.

Summary

There are many dimensions to improving the accessibility and flexibility of online learning in Canada. Measures are needed to extend a high-speed infrastructure as quickly as possible to every institution and learner in the country. Steps should be taken to ensure that lifelong learning will be affordable to Canadians and information technology expenses do not become an obstacle to learning. It will also be crucial to put in place a range of support measures for learners to ensure that the e-learning experience is convenient, meaningful, nourishing and available on an equitable basis. Finally, the goal of flexibility involves ensuring the portability of learning across the country through agreements that enable institutions increasingly to recognize learners' credits from other Canadian institutions. In the final analysis, this goal can only be achieved by action at the pan-Canadian level, where we believe the success of Canadian publicly funded institutions in online learning will ultimately be decided, as shall be seen in the next chapter.

6. Creating Pan-Canadian Synergies and Critical Mass

The large investments required to mount high-quality online learning programs are prohibitive for institutions on their own. Yet real obstacles exist to sharing these costs through cooperation — such as the competitiveness among institutions created by funding formulae, multiple educational jurisdictions and the fragmented Canadian marketplace. High-quality online post-secondary learning will only become available to Canadian learners if new forms of collaboration emerge to create synergies and greater critical mass within the Canadian post-secondary community.

A number of our recommendations — especially those dealing with the development of more learning materials, as well as investment in learning research and learnware product development — will go a significant way toward creating greater critical mass. In this chapter, we look at how a pan-Canadian online learning service can achieve economies of scale and new synergies in the provision of one-stop shopping for learners, instructional design services to faculty members, and marketing support to institutions.

A Pan-Canadian Online Learning Service: Mandate

Our vision is to develop by 2003, the Pan-Canadian Online Learning Service that would provide a comprehensive suite of facilities, services and infrastructure to participating, publicly funded Canadian post-secondary institutions, their learners and their faculty members. In performing these functions, this service could capture economies of scale, build critical mass and create important synergies that will facilitate and encourage these institutions to put a significant portion of their programs and courses into online form. The service's activities would fall into three broad categories.

First, the service would offer learners an opportunity for one-stop shopping for, and thus easy access to, a variety of information, services and learning resources. It would give learners access to the online programs and courses of participating universities and colleges, as well as information about those offerings, transfer of credit, course equivalencies and prior learning assessment. The service would also offer access to services such as electronic application, registration, confirmation and payment. Through the service, learners would also be able to gain access to a variety of digital resources, student services and online facilities. Though all learners would benefit from this array of information, services and sources, the value added for off-campus lifelong learners would likely be greatest.

Second, the service would build critical mass by providing participating institutions and their faculty members with ready access to support for instructional design, knowledge about successful pedagogies, learning technologies, libraries of learning objects and discipline-specific resources.

Third, the service would help institutions by creating critical mass and allowing them to take advantage of pan-Canadian synergies in the marketing of Canadian online courses and programs.

The service would not itself offer courses, programs, degrees, diplomas or certificates. It would recognize the need for different solutions in different regions of the country and encourage, collaborate with, and complement the efforts of provincial/territorial agencies and consortia — such as the Quebec university proposed this year by the Conference of Rectors and Principals of Quebec Universities — that facilitate and encourage e-learning at the post-secondary level.

The service would also respect institutional autonomy and be sensitive to the differences between colleges and universities and the varied circumstances of post-secondary institutions across the country. The service would be responsive to the needs of both English- and French-speaking Canadians.

Recommendation

6.1 A Pan-Canadian Online Learning Service should be created to facilitate, by 2003, the development — by participating, publicly funded, Canadian post-secondary institutions — of a significant number of online courses and programs by encouraging:

- **a. learners via one-stop shopping with a wide range of information, resources and services;**
- **b. participating institutions and their faculty members with an opportunity to take advantage of economics of scale by making available a wide range of services, knowledge and resources to support the development of online courses and programs; and**
- **c. participating institutions with an opportunity to take advantage of pan-Canadian synergies and economies of scale in the marketing of their online courses and programs at home and abroad.**

The service should fully recognize the need for different solutions in different regions of the country and the importance of encouraging, collaborating with and complementing the efforts of other organizations performing similar functions at the provincial and territorial levels. The service should also fully recognize and respect institutional autonomy, the varied circumstances of universities and colleges and inter-institutional consortia and the imperative of responding to the needs of both French-speaking and English-speaking Canadians.

Service Area 1: Helping Learners Across the Country

Right now, any learner seeking post-secondary education faces a bewildering series of choices as to programs and courses. For the traditional high school graduate planning to attend a local post-secondary institution, the decisions can be quite difficult. For the adult learner who wishes to take a course or program online, the challenge can be even greater.

As well, how do online learners discover how to register with an institution or receive guidance as to what course or program meets their specific needs for knowledge or skills without travelling to visit the institution or running up enormous phone bills? How do they find out whether an institution will recognize the educational value of their work experience or credits from another institution? How do they make sure their transcript is available? If they're not on campus, what library and other resources do they use for research and other assignments? How do they know whether they are eligible for financial aid?

The Pan-Canadian Online Learning Service proposed here represents a key means of helping students resolve all of these difficulties. Since more and more Canadians are taking advantage of this new medium of learning, it is urgent to provide pan-Canadian learner support. By 2003 learners of all ages should be empowered by the provision, on a one-stop shopping basis, of a broad range of online information, services and resources.

Links to almost all these services would be provided through the service's portal. The simple course information and advisory services would be in the public domain, but only learners at participating institutions would be eligible to use the other services.

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Information on Courses and Credit Recognition

To help learners with their course and program decisions, the service would provide them with links to information on participating institutions' online courses and programs, as well as to the kinds of qualifications and credits that would be accepted and offered by those institutions. All of this information would be available to the public.

Course information and guidance

The portal would provide links to information on online learning opportunities in the form of searchable data on courses, programs and modules suited to particular learning styles. In this area, the service would work closely with, and build on, the work of programs such as Canada's Campus Connection program under the SchoolNet umbrella, and New Brunswick's TeleEducation, which already provide extensive course and program information. The service would also coordinate with Human Resources Development Canada, which plans to make TeleEducation's searchable data base of e-learning opportunities available through CanLearn Interactive and EduCanada, portals aimed at the Canadian and foreign markets, respectively.

In collaboration with participating institutions, this service should also include an advisory service available online and by telephone, and coordinate it closely with organizations, such as British Columbia's Open Learning Agency, that already provide such services.

Credit recognition

The portal would also offer links to information on the kinds of qualifications and credits accepted and offered by different participating institutions, so that learners would have a clear idea as to their likelihood of being admitted and the number of additional credits they might need for a diploma. Such information could help learners make decisions on course transfers and identify online learning opportunities across the country. The information would be made available in an easily searchable manner and kept current. Athabasca University, for example, now acts as a credit coordinating body in Alberta.

Serving Learners

To render easier the administrative and financial side of post-secondary education — especially when carried out online from a remote location — the service would, in cooperation with participating institutions, assist online learners in the areas of registration, credential assessment assistance and personal support.

Access to electronic registration

The service, through its portal, would provide links to participating institutions' and provincial/territorial agencies' electronic registration and enrolment services. The aim here would be to facilitate the processes that connect lifelong learners with an institution after they have been accepted into a course or program. Such facilitation would be particularly helpful to adult learners with job and family responsibilities that prevent them from travelling to an institution for registration. Athabasca University, the Post-Secondary Application Service of British Columbia, the Ontario Universities' Application Centre (OUAC) and the Ontario College Application Service all provide electronic registration services.

Credential assessment assistance

To speed the assessment of learners' credentials, the service would offer or provide links to provincial/territorial services that facilitate decisions by participating institutions on the recognition of credits for attaining a series of specified learning outcomes. For example, once the necessary security and privacy arrangements are in place, the service could coordinate with provincial/territorial agencies — such as, for example, the OUAC[42] — to improve the capacity to transmit transcripts between institutions or to potential employers upon request by the learner.

The service could also establish and maintain an inventory of generic prior learning assessment cases. It could also provide links to prior learning assessment services such as those offered by the Manitoba Prior Learning Assessment Centre, British Columbia's Open Learning Agency, Human Resources Development Canada and the Canadian Labour Force Development Board. At present, Human Resources Development Canada's CanLearn Information Products Group makes available a variety of prior learning assessment information resources and links to prior learning assessment services.

Personal support

For online and lifelong learners remote from the campus environment, it can often be difficult to find or receive the kinds of fellowship, support or services that are readily available to on-campus students. The service would facilitate and coordinate the provision of such services, with a view to enhancing the quality of the e-learning experience and promoting the culture of online learning communities.

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[42] In 1999, the Ontario University Electronic Transcript System of OUAC won an internationally recognized award for best practices (see **http://www.ouac.on.ca**).

It could provide, for example, one-stop shopping for online links to supplies, information sources, useful software, etc. It could offer access to networks of other learners and peer support in the context of collaborative learning. The service could offer or coordinate the provision of advice to learners involving information exchanges with experts and facilitators. Finally, the service could offer links to, and perhaps eventually provide itself, need assessment tests for loans, financial aid information and counselling on personal finance.

The provision of these links and services would be carefully coordinated with the activities of the providers of similar services, such as British Columbia's Open Learning Agency, New Brunswick's TeleCampus and Human Resources Development Canada through its CanLearn Interactive site. The last now provides access to a variety of student financial planning tools, including loan information and assessment tools and scholarship search utilities.

Library and Resource Centre

Online learners from participating institutions would find a wide range of library and learning resources through the service's portal. The aim would be to offer easy-to-use links to a universe of knowledge and to resources relevant to learners' and faculty members' needs.

There would be links to participating institutions' libraries, digital archives and library networks across the country, and links between these learning resources. The service would also participate in partnerships with participating institutions' libraries to provide learners with greater access to printed materials in library holdings.

The service would also provide increased access by learners to a range of digital and interactive applications and learning objects, including materials available through repositories.

The service would offer links to the digitized collections of heritage institutions, news media and other private sector institutions. Ultimately, the service might well support or participate in projects to digitize materials in great demand by learners.

Empowering Learners

To empower learners, the service should provide on a pan-Canadian basis the full range of information, services and learning resources described above.

Recommendation

6.2 To empower learners, a Pan-Canadian Online Learning Service should promote one-stop shopping for:

- **a. information, including**
  - **i. course information and guidance, and**
  - **ii. institutional credit recognition policies;**
- **b. services, including**
  - **i. access to electronic registration and enrolment services,**
  - **ii. credit assessment assistance, and**
  - **iii. personal support; and**
- **c. an electronic library and learning resource centre.**

Service Area 2: Empowering Faculty and Institutions in Module, Course and Program Development

As noted in Chapter 4 and Appendix C, there remain many obstacles to greater utilization of the new learning tools by faculty members. Early adopters often do not receive support from either their peers or the institution. Other faculty members worry that it may be difficult for them to master these new technologies and modes of instruction. In many institutions, technical and instructional design staff are overworked because they are simply not numerous enough to provide faculty members with the support they need to develop high-quality courses.

These difficulties can be eased by providing faculty members and technical and instruction staff at institutions with access to a wide range of tools to help in the creation of online courses and programs. Offering access to these support tools on a pan-Canadian basis could encourage the development of a critical mass of e-learning resources in institutions and regions where online learning, for one reason or another, has been slow to develop at the post-secondary level.

Given the rapid growth of the global e-learning industry, it is urgent that these support tools become available to faculty members and institutional staff, not only so that Canadian institutions can seize this opportunity, but also so that they can meet the growing competitive challenge from abroad and continue to contribute strongly to social, economic and cultural development in their regions.

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Recommendation

6.3 To empower faculty members in the creation of online courses and programs, faculty members should be given access on a pan-Canadian basis to a wide range of instructional design and technical support tools by the end of 2001.

To this end, we propose creating within the Pan-Canadian Online Learning Service an instructional design and delivery centre to provide such support to faculty members and technical support staff at participating institutions. It should be emphasized that the role of the centre would not involve the creation of knowledge or content for courses, but rather would focus on supporting the delivery of that knowledge or content through the new medium of online learning. The ultimate objective of the centre would be to generate critical mass for the development of online courses and programs in every region of the country. Its development would be phased, involving a modest beginning and then a graduated expansion into new service areas in response to demand.

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We envisage that the centre would provide access to a wide range of information, resources and services, work directly with people at participating institutions and foster partnerships with the private sector to develop e-learning materials requiring significant economies of scale to be feasible.

The centre would also partner with the private sector to deliver much of its other information, resources and services to faculty members and institutions.

Providing Access to Information, Resources and Services

The centre would provide access to two kinds of information, resources and services that would assist participating institutions' faculty members and instruction design and technical support staff in the development of online courses and programs.

First, through the service's portal and other methods, the centre would showcase best practices and provide access to templates for online courses in specific content areas, learning objects for use in courses, a wide variety of instructional materials and services such as training in e-learning, as well as copyright clearance services or support for the licensing of digital works. In implementing this service, the centre would coordinate closely with other providers of similar services, such as New Brunswick's TeleEducation, and Prof&Tic launched in September 2000 by the

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First, through the service's portal and other methods, the centre would showcase best practices and provide access to templates for online courses in specific content areas, learning objects for use in courses, a wide variety of instructional materials and services such as training in e-learning, as well as copyright clearance services or support for the licensing of digital works. In implementing this service, the centre would coordinate closely with other providers of similar services, such as New Brunswick's TeleEducation, and Prof&Tic launched in September 2000 by the

Conference of Rectors and Principals of Quebec Universities to provide Quebec university professors with a full complement of pedagogical, technological and documentary resources for integrating information technology into their courses.

Second, the centre would act as an umbrella, bringing participating institutions and their faculty members together with local experts and service providers in the areas of instructional design and technical support for online learning, including the private sector. However, the centre would retain overall management control and responsibility for quality control with respect to standards met by the providers of these services.

In ensuring the provision of this support, the centre might, where appropriate, provide access to course management systems and centre servers as a temporary measure to help faculty members get online courses up and running.

Working Directly with People at Participating Institutions

The centre would have its own staff to work directly with people from participating institutions and their provincial consortia — both faculty members and the people providing technical and other support services to them. The centre's staff would include people with expertise in learning technology and instructional design, as well as specialists in the learning and technological issues associated with particular disciplines. Though much of this staff support would be provided online, staff would also be expected on occasion to make "house calls" at particular institutions.

When working directly with faculty and support units at participating institutions, centre staff would use tools, standards and methodologies endorsed by those institutions. As a matter of course, centre personnel would work directly with institutional experts and technical and instructional design staff to ensure that the specific e-learning needs and concerns of the institution are met.

Partnering for Large Projects

In the case of such large online projects requiring significant economies of scale, the centre could enter into partnerships with institutions and the private sector. Such projects could include the development of new learning materials, methodologies, tools or delivery mechanisms.

Building the Instructional Design and Delivery Centre

The Instructional Design and Delivery Centre will play a key role in generating critical mass for the development of online courses and programs in every region of the country. Its in-house staff would be distributed across Canada so as to be responsive to particular regional and provincial/territorial circumstances. As well, many of its services would be provided in coordination with regional consortia and provincial/territorial consortia, and through partnering with the private sector, where appropriate.

Recommendation

6.4 To generate critical mass for the development of online courses and programs in every region of the country, a distributed instructional design and delivery centre, with a structure responsive to particular regional and provincial/territorial circumstances, should be established within the Pan-Canadian Online Learning Service to offer support, in coordination with regional consortia and provincial/territorial agencies, on the technical and pedagogical aspects of online course design, development and delivery by:

- **a. facilitating access by participating institutions' faculty members and technical support and instructional design units to information, resources, tools and services, including**
  - **i. access to learning objects, templates for online courses in specific content areas, best practices, instructional materials and services such as copyright clearance, and support for licensing, and**
  - **ii. brokering course development assistance in partnership with local experts, including the private sector, while retaining overall management and responsibility for quality control;**
- **b. working directly with people at participating institutions such as**
  - **i. faculty members, using tools, standards and methodologies endorsed by participating institutions, and**
  - **ii. institutional experts and instructional design and support staff to ensure that institution-specific needs and concerns are met; and**
- **c. fostering partnerships with institutions and software firms to develop materials and methodologies — such as new learning materials or teaching and learning methods, or delivery mechanisms — requiring significant economies of scale to be feasible.**

Service Area 3: Marketing Support

Though the service should play a role in the marketing of online post-secondary courses within Canada and abroad, it should not lead or dominate this effort. In addition to institutions, there are many government departments and agencies at both the provincial/territorial and federal levels that play important roles now and should continue to do so.

The marketing support role of the service should build on its primary functions with respect to learners, faculty members and participating institutions. More specifically, it should take advantage of the synergies and economies of scale available from having a large number of institutional participants to support the marketing of participating institutions' online courses, programs and modules. To this end, the service should work closely with participating institutions and provincial/territorial and federal agencies involved in supporting the marketing of Canadian post-secondary online courses to help coordinate an effective strategy for branding participating institutions' learning material in domestic and foreign markets.

Recommendation

6.5 The Pan-Canadian Online Learning Service should work closely with its participating institutions — and provincial/territorial and federal organizations involved in supporting the marketing of Canadian post-secondary learning materials — to help coordinate an effective branding strategy domestically and internationally.

Building on Learner Services

As called for in Recommendation 6.2, the service will provide a wide range of course information to learners through its portal.

For marketing purposes, course information should be as targeted as possible. Institutions should be encouraged, both individually and collectively, to expand user-friendly inventories of accredited online courses. There should also be basic minimum standards for course listings and indicators to help learners identify the offerings most appropriate to their needs.

> "Cooperative ventures and alliances need to be nurtured on large and small scales. There are many examples of this happening now; we must ensure that our competitive natures also support 'co-opetition.' "
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Recommendation

6.6 Institutions should work collectively and individually to expand user-friendly inventories of accredited online courses and related information, employing minimum standards for course and information listings and indicators to help learners identify offerings most appropriate to their needs.

New Brunswick's TeleEducation represents one modality for facilitating such a development. Also, Canada's Campus Connection, administered by Industry Canada, is an equally viable approach that makes Canadian courseware available to lifelong learners through public access sites.

If the full range of learner services described above are lodged with the service, and many institutions join it, we believe that it will be well positioned to take advantage of pan-Canadian synergies and economies of scale in facilitating this level of institutional cooperation. Through its portal, the service could both carry forward an effective pan-Canadian branding strategy and provide links to the full range of institutional course information.

Ideally, there would also be a common front end for information at every institution and the material would be easily and automatically updated. Basic course information could also be supplemented with details on learning outcomes, types of assignments and other information to help learners compare courses and reach decisions.

Building on Instructional Design and Delivery Services

The service could also support the marketing of Canadian online courses and programs by building on the expertise and relationships it would develop as it helped faculty members and institutions with instructional design and delivery.

For example, quality is one of the major selling points for an online course or program. Without in any way usurping the responsibility of participating institutions to monitor and evaluate the quality of course content, the service could work with them to develop and reach agreement on methods for assessing the quality of pedagogies and technologies used in online learning. Such agreements could take the form of a standard or code of good practice. It could be supplemented by fostering relationships with groups involved in cutting-edge research and development in e-learning.

Recommendation

6.7 The Pan-Canadian Online Learning Service should work with participating institutions and provincial/territorial authorities to develop and agree on methods for assessing the quality of pedagogies and technologies used in online learning, with a view ultimately to developing a code of good practice for online learning.

There are other kinds of standards that are equally critical to the marketing of online courses and programs. Systems, protocols and facilities supporting online courses and programs employ interoperable standards — that is, standards that will allow them to work with the different kinds of hardware, operating systems, etc., used by learners and other institutions. For example, cataloguing systems for learning objects should be compatible so that users can follow familiar paths to find what they need. Similarly, it will be important for the hardware, software and systems supporting these online courses and programs to meet standards for scalability and adaptability — that is, be capable of serving the larger number of online learners who might be attracted by an effective marketing campaign.

Recommendation

6.8 A pan-Canadian effort should be made to promote and encourage the adoption by institutions of:

a. interoperable operating protocols, systems and facilities to support online courses and programs; and
b. high standards with respect to the scalability and adaptability of the technology supporting online courses and programs.

The service, because of its close relations with its participating institutions on standards-related issues, is a logical site to lodge this activity, especially if it is operating an instructional design and delivery centre. CANARIE, in the course of its work on and support for the development of educational applications, has focussed considerable energy on interoperability and scalability too. In 1999 the Prime Minister's Advisory Council on Science and Technology recommended that CANARIE undertake the task of developing interoperability standards for learnware.[43]

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Service Governance, Participation and Funding

There are no precedents that offer guidance in establishing an entity such as the Pan-Canadian Online Learning Service described above. For this reason, we are hesitant to prescribe specific approaches to its governance, participation and funding, but instead present some options in all these areas for consideration by the CMEC, Industry Canada and stakeholders.

Operations and Governance Options

By and large, the service would seek to coordinate or build on existing services provided by consortia and other organizations at the provincial and territorial level. To the degree possible, and where appropriate, the centre for instructional design and delivery would partner or contract with the private sector to promote the development of learnware and facilities. The service would also work in as online a manner as possible and operate a powerful front-end Web site.

Despite this approach, there would still be a requirement for staff, space and a regular operating budget. Staff would be needed to manage the service, deliver and coordinate guidance and support to learners and faculty members, provide access to the library and learning resource centre and administer contracts and links with providers.

Ideally, the service should be run by a body that is sensitive to the full range of publicly funded institutions involved in e-learning and many other features of the pan-Canadian learning landscape (*see Rec. 6.1*). Given the difficulties associated with creating a new body, it would likely be best if the service could be housed within an existing organization.

In many ways, an ideal site for the service would be the CMEC, with its pan-Canadian reach and full participation by the provincial/territorial education ministers who are responsible for post-secondary education in Canada. The CMEC has an impressive record for promoting cooperation and collaboration among provincial/territorial governments and institutions of higher learning.

Another possibility would be CANARIE, a not-for-profit corporation supported by its members, project partners and the federal government. Its board members come equally from the public and private sectors. Through its support for online educational applications and its Learning Program, CANARIE has an excellent reputation for promoting creative collaboration in the area of online learning.

If none of these organizations can take on the service, then it will likely be necessary to create a new entity. Whatever governance model is chosen, we believe the service should be guided in its activities by a structure that is at arm's length from any specific government and broadly representative of stakeholders.

Recommendation

6.9 The Pan-Canadian Online Learning Service should be governed by a structure that is at arm's length from specific governments and broadly representative of stakeholders.

Participation

Any publicly funded Canadian post-secondary institution — and any Canadian consortium to which it belongs — should be able to join the service and benefit from its services, both in terms of support for its faculty members and its potential and actual learners.

To be eligible for participation, institutions should initially commit themselves to providing high-quality online learning opportunities. This commitment could take the form of a statement endorsing service principles on the quality of e-learning provided through the service, and the importance of a continuing determination to improving quality. This commitment would not in any way be intended to limit or constrain any institution's control over the content of its courses.

Recommendation

6.10 Participation in the Pan-Canadian Online Learning Service should initially be open to all publicly funded Canadian post-secondary institutions — and any Canadian consortium to which they belong — that demonstrate a commitment to high-quality online learning.

If the service is to act as a catalyst for online learning, then there is a certain logic to having its participation requirements grow more stringent as its services evolve. Eventually, it is possible that, rather than just asking prospective participants for a general statement of commitment to high-quality e-learning, the service could ask them for a specific commitment to provide a certain portion of their courses or programs online by a given date. In considering what such quantitative commitments should be, it will be important to recognize that institutions may have a heavy concentration of courses that do not lend themselves

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to online delivery. For example, nursing, education, science, fine arts and engineering programs contain a significant number of courses and practical course components that may best be taught through hands-on and face-to-face interaction.

Funding

In the short term, participation in the service should be free for publicly funded Canadian institutions and consortia that meet the participation criteria. Initially, government should provide seed funding for infrastructure, learner services and marketing, and the service should charge fees for value-added services as these are developed.

Recommendation

6.11 In the short term, the Pan-Canadian Online Learning Service should be financed via:

a. seed funding from governments for infrastructure, learner services and marketing; and

b. fees for value-added services as these are developed.

In the longer run, a number of options are available to ensure that the services's activities are sustainable. For example, the service could ultimately charge participation fees. It could also start charging institutions for services where demand warrants. Another possible approach would be to charge service fees to fund the maintenance of its facilities and services. The service could also start charging fees to participants and others for showcasing and providing recognition for their learning applications and programs. Finally, as e-commerce advances, it might also prove feasible for the service to charge online to recover service costs.

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7. Conclusion

The previous six chapters present an action plan to expand significantly online learning in Canadian post-secondary education. In framing measures to this end, we have kept in mind that e-learning is not an end but a means — a way of strengthening post-secondary education to the benefit of learners in every walk of Canadian life.

Our action plan proposes initiatives intended to encourage innovation in post-secondary education and place learners at the centre of their own education. We have recommended a number of measures intended to enhance the quality of the post-secondary learning experience through new institutional strategies, support for the creation of more high-quality online learning materials, and investments in learning research and learnware product development. We have urged several initiatives to improve the accessibility of post-secondary learning opportunities by extending and upgrading network infrastructures, contributing toward the affordability of post-secondary education, providing an array of supports for online learners, and setting in motion a process to ensure the portability of learning across the country. Finally, to create critical mass and take advantage of coast-to-coast, pan-Canadian synergies, we have proposed the establishment of the Pan-Canadian Online Learning Service to assist learners, empower faculty members in online course and program development, and help institutions market the results.

This action plan is a clear response to the 21st-century reality of a global society where people's skills and knowledge largely determine their success as individuals, and the social and economic health of their communities and countries. The challenge is, of course, to deal with the reality that the skill and knowledge requirements of such a society shift and evolve rapidly. For this reason, one of our overriding preoccupations in our deliberations has been to foster a lifelong learning culture in Canada as an essential foundation to building a civil and prosperous society. We believe that it is possible to use the transformative power of these new learning tools to make sure all Canadians can take advantage of lifelong learning opportunities. Though global players are emerging to meet these needs, they will be responsive only to their own domestic bases and global market forces. If we want to ensure that post-secondary education remains responsive to Canadian social

and economic interests, concerns and priorities at the local, regional and national levels, then we must build the capabilities of our own post-secondary institutions and learnware industry to provide e-learning opportunities to Canadians and the world.

In our view, changes now under way have so many ramifications that they have created a need to rethink the whole learning enterprise — both the respective roles of learners, instructors and institutions and their relationship to the society and the economy as a whole. If we are to succeed in a global knowledge-based society we must understand this new learning reality and our respective positions in it. This understanding cannot be achieved without considering the viewpoints of all stakeholders, as well as the views of ordinary Canadians. It could be embodied in a charter laying out the principles governing this new learning reality. In the case of post-secondary education, precedents for such an exercise exist in the form of UNESCO's 1998 International Commission on Higher Education in the 21st Century.

We would, therefore, urge the CMEC to develop a draft charter for learning in the 21st century that provincial and territorial ministers of education could use in consultations with their stakeholders to raise awareness of these new learning realities.

Recommendation

7.1 **In light of the new and crucial role of learning as a social and economic infrastructure for the knowledge-based society, and the far-reaching potential impact of new learning technologies on the learning enterprise, the Council of Ministers of Education, Canada should develop a draft charter for learning in the 21st century that provincial and territorial ministers of education could use in consultations with their stakeholders to raise awareness of the new learning environment.**

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Glossary

Articulation agreement: "Articulation" refers to the process for facilitating the movement of a student from one type of educational institution to another.

Asynchronous training: Refers to training where interaction between teachers and students takes place intermittently, such as through links to HTML content, or e-mail, news or discussion groups.

Authoring systems: Software specially designed to facilitate the creation of online courses and learning modules.

Bandwidth: The transmission capacity of an electronic line such as a communications network, computer bus or computer channel. It is expressed in bits per second, bytes per second or in Hertz (cycles per second).

BPS: Bits per second.

Broadband: High-speed transmission. The term is commonly used to refer to communications lines or services at T1 rates (1.544 Mbps) and above.

Courseware: Any type of instructional or educational software programs.

Digital subscriber line (DSL): A technology that dramatically increases the digital capacity of ordinary telephone lines (the local loops) into the home or office.

Distance learning: Any type of educational situation in which the instructor and students are separated by time, location or both.

E-learning: What occurs when education and training (typically credit but also non-credit) are delivered and supported by networks such as the Internet or intranets. Learners are able to learn any time and any place. In this report, we use the terms "online learning" and "e-learning" interchangeably.

Fibre optics: The use of specially manufactured, hair-thin glass fibre for the transmission of communications in the form of light.

Instructional design: Systematically translating general principles of learning and instruction into plans for instructional materials and learning.

Internet service provider (ISP): An organization that provides access to the Internet.

Interoperability: The ability of two or more hardware devices, or two or more software routines, to work together.

Learning object: Any entity, digital or non-digital, that can be used, re-used or referenced during technology-supported learning. Examples of learning objects include multimedia content, instructional content, instructional software and software tools that are referenced during technology-supported learning.

Learning management systems: Software that tracks student progress in a course and indicates completions. At the least, learning management systems track individual student progress, record scores of quizzes and tests within an online learning program, and register course completions.

Learnware: New media learning tools consisting of computer software and courseware, including multimedia and interactive programs used in online learning.

Meta tag: An HTML tag that identifies the contents of a Web page. Using a format, meta tags contain such things as a general description of the page, keywords for search engines and copyright information.

Module: A self-contained hardware or software component that interacts with a larger system.

Optical fibre: A thin glass wire designed for light transmission. A single hair-thin fibre is capable of supporting 100 trillion bits per second. In addition to their huge transmission capacity, optical fibres offer many advantages over electricity and copper wire.

Online learning: What occurs when education and training (typically credit but also non-credit) are delivered and supported by networks such as the Internet or intranets. Learners are able to learn any time and any place. In this report, we use the terms "**on-line learning**" and "e-learning" interchangeably.

Portal: A Web site that acts as a "doorway" to the Internet or a portion of the Internet, matching a person's needs to available offerings. **click2learn.com** is the Web's pre-eminent e-learning portal (now renamed e-learning marketplace).

Prior learning assessment: A process involving the identification, documentation, assessment and recognition of learning acquired through formal and informal study as well as work experience.

Scalability: Refers to how much a system can be expanded. The term by itself implies a positive capability. For example, "The device is known for its scalability," means that it can be made to serve a larger number of users without breaking down or requiring major changes in procedure.

Synchronous training: Synchronous training refers to training that permits teachers and students to interact simultaneously in real time through methods such as live chats, whiteboards or video conferences.

Threaded discussion: A running log of remarks and opinions about a subject. Threaded discussions are used in chat rooms on the Internet and on online services.

Appendix A: Canadian Examples of Online Learning

A number of Canadian post-secondary institutions have already undertaken important online learning initiatives, including the following, among others.

- The *University of British Columbia* (UBC) operates an online learning program that provides online course material to Mexico and Latin America. UBC was the first institution in the world to make use of WebCT, the best-selling online course-authoring tool, which was developed on its campus.
- *Athabasca University,* "Canada's Open University," had 435 online courses up and running in March 1999. A number of these employed the University's ViTAL (virtual teaching and learning) environment. Others offered online communication with a course tutor. The university's three graduate programs — MBA, Master of Health Studies and Master in Distance Education — are entirely online. Nearly all of Athabasca University's 23 000 students are online.
- *Téle-université du Québec* was established in 1992 to provide distance learning services for the Université du Québec, and now has more than 17 000 students. With some 120 online courses, it offers online diploma programs in corporate finance and information technology, as well as an online master's degree in information technology. The institution also offers online training courses in multimedia, pedagogical design of technological learning environments, core systems of knowledge in organizations, and engineering for distributed systems to 16 African countries in the Francophonie.
- British Columbia's *Open Learning Agency* is recognized provincially, nationally and internationally as a developer and provider of flexible and accessible learning opportunities. It includes a college, a university, an educational TV station and many other innovative services. Through its BC Open University, it served 6500 students in 1999, offering 20 degree programs in arts and science, business, health science and technology — all of which are recognized within British Columbia's public post-secondary system and beyond. The agency also helped 3000 college-level learners in 1999, with widely recognized credit programs in business, general studies, health and human services, and information technology. Both the university and college programs involve e-learning as well as cooperative arrangements with other institutions, professional associations and employers.

- *Collège Boréal* is a four-year-old, publicly funded college serving Francophones scattered across the vast expanse of Northern Ontario. It relies on distance education technologies such as audio conferencing, audiographics and video conferencing for the delivery of 32 programs to six remote campuses. Remote learners complete half of their first-year courses in this way, while the other half is done face-to-face. A telecommunications network links the seven college campuses through a wide area network that supports computer, video-conference and telephone systems. In many programs, faculty members and learners use IBM ThinkPad^{RM} computers.[44] The centre for informatics and communications technology at the college provides technical support to both students and faculty.
- *Acadia University* is a fully wired institution where all students, faculty members and staff have access to network resources anytime, anywhere on campus. The Acadia Advantage program, started in 1996, today provides all students and faculty members with notebook computers. The mobile computing environment and technology access that everyone shares have fundamentally changed teaching practices and the way technological tools are used to accomplish learning objectives. Students at Acadia participate in virtual work placements, create music digitally, practise French online, search the Internet in class to analyse presentations, write in partnership with students across North America and perform digital science experiments. They created the first online university radio station in Canada, elected their student leaders electronically, wrote a Web-based course evaluation system, and continue, in their capacity to apply technology to learning, to drive innovation on campus.
- The *Technical University of British Columbia* (TechBC) is Canada's newest public university with initial undergraduate and graduate programs in information technology, interactive arts, and management and technology. To meet the goals of effective pedagogy and enhanced access and flexibility, courses are offered online to the greatest extent possible. Currently, more than 50 percent of all delivery is online and this proportion is expected to grow as new tools become available. The program is delivered using the component-based course management system developed at TechBC.

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[44] A.W. (Tony) Bates, *Managing Technological Change: Strategies for College and University Leaders*, p. 29.

- The *University of New Brunswick Library* now operates a digital library for traditional and online learners. The library provides access to an increasing number of data bases such as Medline and PsychInfo and has also purchased a number of full text files to support students and faculty. Access is also available to more than 4500 full text journal titles from a variety of suppliers and publishers. Downloads from the library have been exponentially rising, from some 10 000 articles in 1997 to over 225 000 in 1999. The library's E-Text Centre publishes some 15 academic serials and provides a platform to publish a variety of materials and build a "digital object repository," including learning objects. The digital library serves learners and faculty at all New Brunswick universities and the University of Prince Edward Island.
- The *Virtual Campus of Collège de Bois-de-Boulogne* in Montréal aims to help students achieve their learning objectives by providing them with a large set of pedagogical resources, mostly works by college faculty members. The material is intended to complement a textbook and is usually taken from MSWord documents and converted to HTML, facilitating their editing by the teacher on the Internet to allow immediate updating. Teachers and students stay in contact with each other via e-mail and a range of online news groups and discussion forums.
- The *Canadian Virtual University* (CVU) is a consortium founded by Athabasca University, the BC Open University, the University of Manitoba, Brandon University, the University of Victoria, Laurentian University and Royal Roads University. Each offers at least one program in the consortium's joint data base and will eventually provide additional student support services linked to a common catalogue of courses.
- The *Consortium of Higher Education Research Universities* (COHERE), led by the universities of Waterloo, Alberta, Guelph and York, seeks to generate innovation by marrying their research cultures with shared online courseware.
- *Contact North*, a non-profit organization with its headquarters in Sudbury, Ontario, has for 13 years provided student services in more than 145 community learning centres, many of them in remote locations. Its telecommunications network supports audio and video conferencing as well as computer-communications tools. In 1999, the International Council for Distance Education gave Contact North its Award of Excellence for Institutional Achievement in Distance Education.

- *TeleEducation New Brunswick* has since 1993 provided courses from provincially funded universities, colleges and secondary schools to 40 communities across New Brunswick. According to Terry Anderson and Stephen Downes, in *Models and Strategies Towards a Canadian On-line Education Infrastructure*, "This regional network is unique in that it has explicitly focussed on the creation of a knowledge-based economy by combining economic development goals with education and training goals. TeleEducation, through its Program Development Fund, has supported 37 on-line education development projects . . . . Unlike similar funds in other provinces, TeleEducation's funding has been awarded to both public sector institutions and private sector firms. The support of TeleEducation for both development and delivery of on-line programming has been a key impetus to a local educational software industry and has resulted in New Brunswick producing the highest per capita offering of on-line courses in Canada."[45]
- The *Cultural Management Institute* of the University of Waterloo is a virtual, online professional development "school" for cultural managers. Its skill/competency training courses are available 24 hours a day, seven days a week, in the workplace, in the studio, at home and on the road, wherever an Internet connection is available. This recent innovation in delivering professional development services to the working cultural manager has been developed in response to a long-established need in the cultural community.

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[45] Terry Anderson and Stephen Downes, *Models and Strategies Towards a Canadian On-line Education Infrastructure*, p. 9.

Appendix B: Global Players

Global players emerging to take advantage of the new online learning environment include the following.

- *Columbia University* in New York has formed a wholly owned, profit-making enterprise, Columbia Media Enterprises, whose goal is to "create and implement a coordinated strategy that maximizes productive use of intellectual capital of the university in the new media marketplace."
- Top American universities such as *Harvard, Massachusetts Institute of Technology, Stanford, Cornell, Pennsylvania State* and *Berkeley*, to mention only a few, have mounted large-scale efforts and made major investments to address the structural changes in post-secondary education and set in motion new initiatives in Internet-based learning and training.
- The *University of Phoenix*, the largest accredited private university in the United States, has made large investments in the latest e-learning technologies to reach out to adult students around the world — including Canada — and offers bachelor's, master's and doctoral degrees in many subjects.
- In Germany, the state of Baden-Württemberg has provided funding of 8.8 million marks (about C$6 million) over five years from 1998 for the establishment of *Germany's first virtual university*, run by the universities of Freiburg, Karlsruhe, Mannheim and Heidelberg. The aim of the initiative is to provide individual distance learning via e-mail, Integrated Services Digital Network (ISDN) or digital television.
- In Italy, the *International Multimedia University* (IMU) is currently being established in Umbria. IMU is a commercial entity that plans to serve "as a clearing house for the electronic delivery of courses taught by experts from all over the world to learners all over the world." The aim is to complement rather than supplant traditional universities, with "highly specialised" courses aimed at local or transnational companies. Major shareholders in IMU are the Region of Umbria, two public sector corporations, the Italian National Electricity Corporation, Italian National Broadcasting Corporation and some small and medium-sized enterprises. The University of California, Los Angeles, has also given the venture its support and "will be an important partner in developing, shaping and validating structure and content of distance education offered through IMU and for verifying standards of instruction and teaching quality."

Appendix C: An Online Learning Primer for Post-Secondary Institutions

If online learning is not just a technology but a new medium for teaching and learning, then its use by a post-secondary institution should be viewed, not on an ad hoc basis, but strategically.

Crucial to such an approach is an integrated and multi-stage strategic planning process. Here we will describe such a process, point to some of the elements of a strategic plan, suggest some important strategies with respect to content and infrastructure, and delineate some of the key considerations related to implementation and evaluation. It goes without saying that institutions should adapt these suggestions to their own particular circumstances.

An Integrated Strategic Planning Process

The AUCC, in its Statement on Technology Enhanced Learning, underscored this year the importance of integrating technology into an institutional strategic plan as a "framework for action." The Task Force on Learning Technologies in its report for the Council of Ontario Universities called for strategic planning by institutions and stated: "Evidence suggests that the successful integration of LTs (learning technologies) into the learning environment builds on a strong vision of the strategic objectives of the institution and on the planning of all aspects of the implementation of LTs. Moreover, a clear strategic plan will allow universities to respond much more quickly to opportunities as they arise. It is important to emphasize that in the university context any planning process is, to a certain extent, iterative, that the process must balance bottom-up initiatives and the development of a top-down framework, and that ultimate success depends on stakeholder involvement, including that of students."[46]

Here is a checklist for what, depending on an institution's circumstances, such a process could involve:

- **assembly of a change management team;**
- **articulation of a vision in relation to the overall mission of the institution;**
- **incorporation of technology into the institution's strategic plan;**
- **selection of appropriate strategies and resource requirements;**
- **modification of organizational and administrative strategies;**

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[46] Task Force on Learning Technologies, *A Time to Sow*, p. 13.

- **design of an implementation plan; and**
- **evaluation of performance and effectiveness.**

Initial Steps

The first step in developing a strategic plan for online learning should be assembly of a team to lay the groundwork for a strategic vision of what the institution hopes to achieve with e-learning. Only then will it be possible to take the necessary systematic approach to developing a strategic plan for taking advantage of this new medium for learning.

This team could be led by a senior leader in the institution prepared to act as a champion for online learning. The team should gather input from all stakeholders and examine e-learning pilot projects conducted by the institution itself and others. In some cases, it may be necessary to augment existing data with one or more new pilot projects. If so, it will be important to invest sufficient resources for the projects to be meaningful, and carry out an extensive review of the lessons to be learned.

The second step in preparing an institution for a commitment to online learning is to lay out a strategic vision for e-learning. The move to online learning can involve a substantial change in the relationship between an institution, its faculty members and its learners, especially when e-learning involves distance education as opposed to on-campus. But even when online learning is used as an enriching complement to traditional classroom instruction, the required infrastructure investment can be considerable and subtle transformations can occur. For these reasons, the strategic vision for online learning should be articulated in relation to the overall mission of the institution.

The third step should be to develop an overall strategic plan incorporating learning technologies and focussed on teaching and learning. According to Tony Bates, in *Managing Technological Change: Strategies for College and University Leaders*, such a vision can help mobilize senior management behind technological change. It is also a simple recognition that the technology can change the whole nature of the context for teaching and learning.[47]

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[47] Bates, *Managing Technological Change*, p. 45.

What are some of the basic elements of such a plan? It could include a vision of teaching and learning that is learner-centred and augmented by technology. It could take into account the institution's culture and strengths, as well as where it hopes to be positioned in the future. It could build technology into a business plan tailored to the institution's emphases and priorities. It could clearly define the respective roles of technology and face-to-face teaching and how these should complement each other.

Finally, the plan could focus on how to maximize the flexibility, reliability and usability of the technology over the short, medium and long time frames. To this end, it will also be necessary to have a plan for ensuring the hardware, software, courseware and systems used are interoperable, scalable, reusable and sustainable.

Strategies to Enhance Quality

A number of strategies should be used to ensure that online learning enhances the quality of the post-secondary learning experience. The first is to take a very systematic approach to the development of online modules, courses and programs. The second is to take measures that will encourage faculty members to become involved in e-learning.

Creating Online Modules, Courses and Programs

Though online learning in its initial phases within an institution depends very much on the work of individual instructors acting alone or with a few others, a serious commitment to online learning requires a systematic approach to course and program development (*see Rec. 4.1*). Otherwise, it will be difficult to mobilize the energies of the institution behind e-learning.

Institutions should set standards with respect to the quality of online courses and programs. Such standards could address the uniqueness or value of the content of the learning materials. Standards could also apply to the instructional design of courses — the clarity of their learning objectives, and their likelihood of resulting in desired learning outcomes. It may also be desirable to have standards relating to the production values of the course materials, as well as their usability by students without learning new skills or significant outlays for equipment or better connectivity.[48]

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[48] For a discussion of some of these aspects of quality, see Bates, *Managing Technological Change*, pp. 65, 66.

To achieve the desired level of quality, it will be important for the institution to provide significant support to those engaged in multimedia design and the development of online curricula. Instructors involved in the creation or provision of online courses could have access to centralized services that provide expert support in instruction design and the technology. Research and development work on technology applications for learning and teaching could also require considerable attention as a means of improving the quality of online course offerings.

In an environment where institutions will increasingly belong to consortia and learners may be taking courses from several colleges and universities at once, institutions may have to devote considerable resources to ensuring content can be shared with other institutions and credits can be transferred between institutions. Such an effort can require review of accreditation and admissions policies. Colleges and universities may also have to re-examine their policies for prior learning assessments to take into account work experience as well as credits from other institutions in making decisions on admissions.

In an environment characterized by students using different platforms, and by a range of consortia and strategic partnerships, it will be important for institutions to make sure online courses are technology-independent — that is, capable of being run on a variety of different hardware and software platforms and downloaded via a wide range of different kinds of connections.

Online courses should also be designed to scale — that is, keeping in mind the number of learners, their level of understanding of the course materials, their technological skills and the equipment to which they have access. Otherwise, the online course may be neither economically sustainable nor useful to learners.

Courses and programs should be responsive in a timely way to learners' career and other needs, and demands in a rapidly changing environment. To this end, development times should not be extended unduly.

Supporting Faculty Members

Though roles may change, faculty members remain as crucial to the quality of the online learning experience as they have been in a traditional classroom or laboratory setting. Yet there remain many obstacles to greater use of the new learning tools by faculty members.

Early adopters often do not receive support from either their peers or the institution. Not a few faculty members lack a computer or Internet access. Others worry that it may be difficult for them to master these new technologies and modes of instruction. Some are concerned that the time they spend and the contributions they make through these innovations in teaching remain unrewarded either in the form of remuneration or decisions on tenure and promotion. Other faculty members, uncertain as to what implementation of e-learning will mean for their institution, fear the technology may displace instructors, degrade the quality of education or demand so much time they will have little left for research. Many simply don't have the time to invest in preparing online courses, and need release time from other duties to get started and acquire the necessary skills.

To overcome these obstacles, post-secondary institutions should systematically support faculty involvement in e-learning (*see Rec. 4.2*). There are several forms this support can take.

Institutions should encourage and support early adopters of online learning among the faculty. Institutions should also be very clear as to what faculty members should expect from a move to e-learning. Institutions should think seriously, too, about re-allocating their resources to ensure all faculty members have access to the hardware, software and communications links needed to perform their role in providing online learning.

Institutions should provide faculty members with continuing support on technical and instructional design matters. Possibly, there could be a help desk that can be contacted online or by telephone. Another useful approach could be an institutional Web portal with online resources and teaching tips. This portal could contain an institutional repository of learning objects, modules, courses and programs that could be meta tagged[49] for easy access.

It will be important, too, for institutions to provide faculty members on a systematic basis with ample opportunities to develop their skills in, and understanding of, e-learning. Peers could play a key role as mentors in providing these opportunities. Staff development sessions could occur on a regular basis and use the same online learning technologies and pedagogical approaches as the institution and its component faculties employ in actual online teaching. Support should also be available for faculty members who wish to undertake a research project involving the new learning tools.

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[49] See glossary.

Institutions should provide faculty members with clear incentives and rewards for work on online courses and programs. For example, institutions could consider innovations in teaching as possible criteria in decisions on tenure and promotions. Institutions could also put in place mechanisms for exchanging best practices among faculty members and recognizing online teaching innovations.

An important incentive for faculty members would be the re-allocation of workloads so that they would have the time to devote to developing or providing an online course or program, as well as carrying out the research that can be such a factor in tenure and promotion decisions. However, as noted in Chapter 4, institutions will require additional resources in order to provide commensurate release time for all faculty members engaged in e-learning.

Strategies for Improving Access

Institutions committed to online learning should also develop strategies to ensure that all members of their communities — on-campus learners, off-campus learners, faculty members, and so on — have access to a robust network infrastructure and are in a position to take full advantage of it.

Recommendation 5.2 calls on post-secondary institutions, if they contemplate a serious commitment to e-learning, to establish as a goal the construction of a robust network infrastructure with high-speed connectivity, if they have not already done so. The discussion in Chapter 5 surrounding this recommendation proposes key features of such an infrastructure that institutions should consider putting in place, depending on their circumstances.

However, achieving access to meaningful online learning experiences involves considerably more than providing a high-speed connection. Recommendation 5.7 calls on institutions to provide a full range of technical and other supports to learners so that they can take full advantage of online learning opportunities.

One obvious step is simply to make students aware of online learning opportunities. Among other steps, institutions can inform learners online about them and actively market their online courses and programs. Institutions can also involve student associations in facilitating greater use of technology by learners.

All learners have expectations about what constitutes a meaningful learning experience. For the growing numbers of learners familiar with the online world, these expectations may extend to matters such as interactivity, ease of use, the quality of the multimedia, and so on. Institutions launching e-learning courses and programs should make a serious effort to understand these expectations and respond to them.

Technical glitches and unfamiliarity with the technology can pose an unnecessary and sometimes insuperable obstacle to online learning. Institutions should consider providing technical support — possibly 24 hours a day, seven days a week — to meet learners' needs.

Institutions should also consider offering a range of Web-based services to make the e-learning experience as meaningful and nourishing as possible. Orientation services can be made available to learners online, as can flexible one-on-one tutoring and guidance and counselling services online. Electronic library and other digitized learning resources could also be provided online to learners — ideally in the same quantity and quality as they would be for a traditional course.

Post-secondary institutions should aim to support different learning styles in their e-learning offerings. On-campus university or college undergraduates will need online learning modules and services that enrich and complement instruction provided in a traditional classroom or laboratory. For many adult and part-time learners with family and job commitments, the only avenue to learning will be online courses and programs, and ideally these should be flexible in their delivery, fully interactive and, to the degree possible, customized in terms of pacing and content to the personal needs of learners.

Finally, institutions should consider providing a full suite of educational services and learning resources for learners with disabilities. It would also be helpful if workstations with assistive devices could be made available to learners with disabilities.

Implementation and Organization

A number of factors contribute to a successful implementation of e-learning in institutions.

Resources should be focussed, for example, on just a few unique or particularly outstanding online learning initiatives that can be delivered globally, rather than frittered away on projects with significantly less chance of success or of making an impact.

Institutions should make e-learning an integral part of budget making across the institution. Otherwise, online learning may languish at the periphery of institutional activities. For institutions with a serious commitment to e-learning, information technology expenditures should be built into the their base operating budgets. Budget decisions should reflect the costs over the life-cycle of the technology for training, user support, maintenance and replacement, as well as a probable increased demand for technical communications and information technology support.

Online learning should not be the responsibility of some isolated department but should be fully integrated with the other responsibilities of all faculties and departments across the institution. To this end, the implementation plan should reflect the views of multiple users and allow for new forms of collaboration, and partnership across the institution may be needed.

One should also keep in mind that both e-learning requirements and the technology will continue to change rapidly. For this reason, it will be important to re-evaluate the technologies used every three to five years.

Institutions should consider centralizing support services such as specialized multimedia and online learning facilities, as well as bookstores and administrative services, to mention only a few. Without such centralization, it may be difficult to establish the kind of strategic planning and integrated decision making required for a successful implementation of e-learning. As well, too decentralized an approach can lead to a costly duplication of services. Such centralization could also facilitate the meta tagging of learning objects so that faculty can share them.

Finally, in developing an implementation plan, institutions should consider entering into partnerships, strategic alliances and/or consortia to improve their competitiveness and share the considerable up-front costs of implementing online learning.

Evaluating Success and Failure

To provide feedback as a basis for improvement in online learning, post-secondary institutions should develop mechanisms for evaluating the integration and management of new teaching and learning technologies.

To this end, they should consider defining anticipated outcomes from e-learning initiatives and measurement tools for assessing them. The real costs of such initiatives certainly deserve examination, as does their contribution to the institution's effectiveness in meeting goals such as providing a quality education, responding to learners and other stakeholders, undertaking innovation, and making full use of staff talents and expertise. It will also be important to examine such initiatives in relation to pedagogical standards (effectiveness of online learning and teaching), technological standards (effectiveness of online learning technology) and the processes used for course approval. An expert group or other unit equipped to evaluate systems can assist by developing measures of learning effectiveness — retention of content, rates of course completion and other learning outcomes.

Assessments can also focus on questions of efficiency, such as whether duplication exists or resources are properly allocated in light of strategic priorities. In the case of many post-secondary institutions, it may be important to examine how the online learning initiative affects its research mission.

In addition to providing input into the institution's evaluation of its own initiatives, such information should be fed to organizations providing funding for e-learning research and development, as well as the Pan-Canadian Online Learning Service. There the information can provide the basis for the development of best practices, a data base of experiences with e-learning, and ongoing research and development work on online learning.

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(Human Resources Development Canada)
http://www.hrdc-drhc.gc.ca/hrib/learnlit/cesg

Canada's Campus Connection
(Industry Canada)
http://campus.skillnet.ca

Canadian Institutes of Health Research
http://www.cihr.ca

Canadian Network for the Advancement of Research,
Industry and Education
(CANARIE)
http://www.canarie.ca

CanLearn Interactive
(Human Resources Development Canada)
http://www.canlearn.ca

Community Access Program
(Industry Canada)
http://cap.ic.gc.ca

Council of Ministers of Education, Canada
http://www.cmec.ca

EDUCAUSE
http://www.educause.edu

Government of Alberta
http://www.innovation.gov.ab.ca/supernet

Learning Program
(CANARIE)
http://www.canarie.ca/funding/flearning.html

Natural Sciences and Engineering Research Council of Canada
http://www.nserc.ca

Northern Alberta Institute of Technology
http://www.nait.ab.ca

Office of Learning Technologies
(Human Resources Development Canada)
http://olt-bta.hrdc-drhc.gc.ca

ONet Networking
http://www.onet.on.ca

Ontario Universities' Application Centre
http://www.ouac.on.ca

Open Learning Agency
http://www.ola.bc.ca

Provincial Learning Network
(British Columbia Ministry of Education, Province of British Columbia)
http://www.plnet.bc.ca

Quebec Scientific Information Network (*RISQ*)
http://www.risq.net/welcome

RESP Canada Inc.
http://www.respcanada.com

SchoolNet
(Industry Canada)
http://www.schoolnet.ca

SchoolNet Multimedia Learnware and Public Access
Applications Program
(Industry Canada)
http://www.schoolnet.ca/funds

Social Sciences and Humanities Research Council of Canada
http://www.sshrc.ca

TeleEducation New Brunswick
http://teleeducation.nb.ca

TeleLearning Network of Centres of Excellence
http://www.telelearn.ca

Telelearning Policy Initiative
(Simon Fraser University)
http://www.sfu.ca/tpi

Universitas 21
http://www.universitas.edu.au

Web-based Education Commission
http://www.hpcnet.org/webcommission